

1.0 PROJECT PURPOSE AND NEED

1.1 Introduction

The Federal Transit Administration (FTA), as the lead Federal agency, and the City of Alexandria, as the project sponsor and joint lead agency, in cooperation with the Washington Metropolitan Area Transit Authority (WMATA), and the National Park Service (NPS), prepared this Final Environmental Impact Statement (EIS), under the National Environmental Policy Act (NEPA), for the proposed Potomac Yard Metrorail Station (or “the project”). Because the project has the potential to utilize Federal funds, FTA serves as the lead Federal agency. The City of Alexandria will be responsible for the construction of the station. Since the Federal action on this project relates to providing only a portion of the funding to construct the Metrorail Station, FTA’s role as the lead Federal agency does not include direct responsibility for construction of the station. WMATA will accept and operate the Metrorail Station. The project consists of construction of a new Metrorail station and ancillary facilities located at Potomac Yard within the City of Alexandria along the existing Metrorail Blue and Yellow Lines between the Ronald Reagan Washington National Airport Station and the Braddock Road Station. **Figure 1-1** shows the project study area in northern Alexandria and southern Arlington County. The project would serve existing neighborhoods and retail centers as well as high-density, transit-oriented development planned by the City of Alexandria. The project would provide access to the regional Metrorail system for the U.S. Route 1 corridor of north Alexandria. The Potomac Yard area is currently without direct access to regional transit services, such as Metrorail.

The National Park Service is a cooperating agency because of the project’s impacts to natural and cultural resources of the George Washington Memorial Parkway. Under the project, NPS will consider issuance of a permit for the temporary use of land under its administration for construction staging and the exchange of property for the proposed permanent use of a portion of that land for the project.

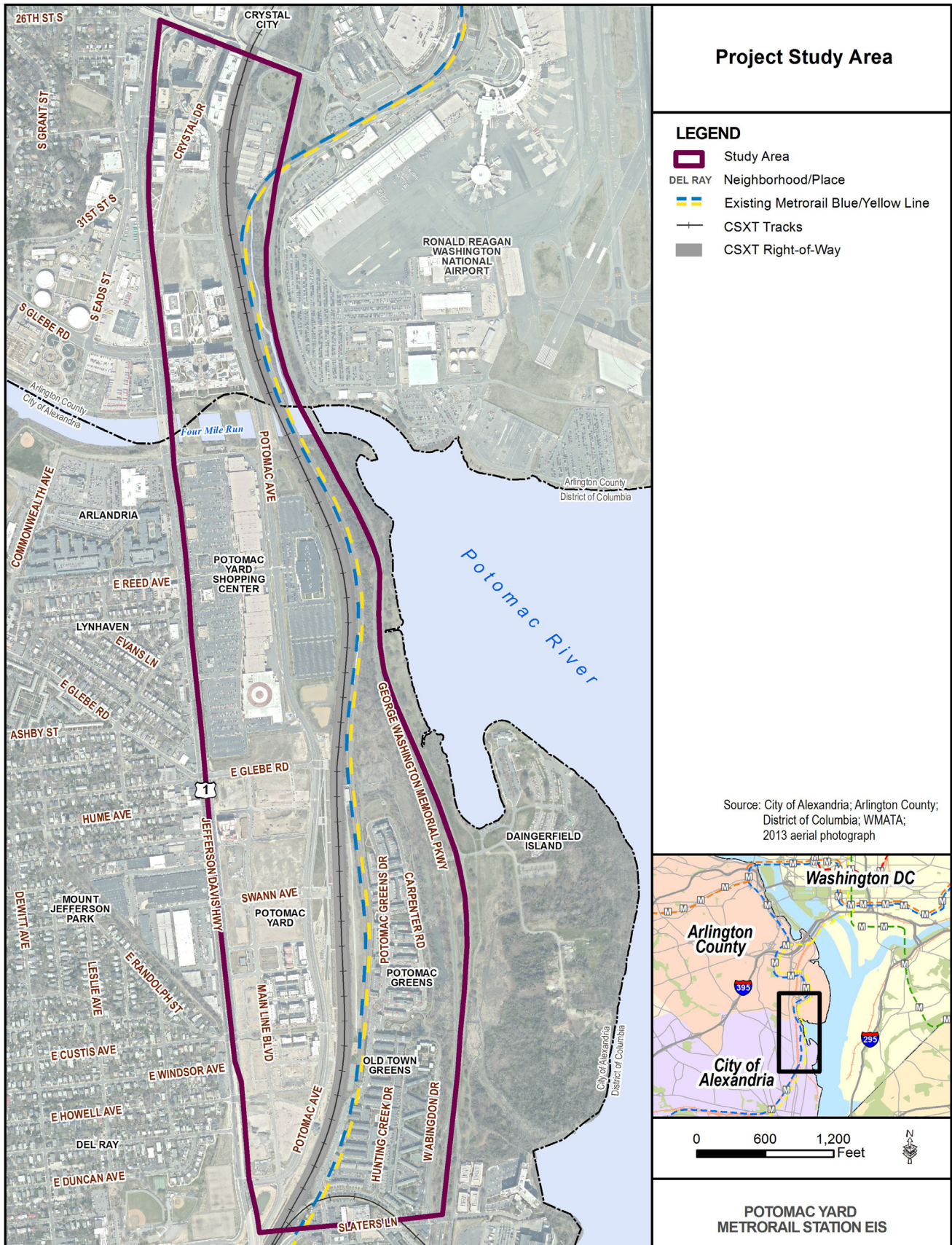
1.2 Project Background

The study area for the proposed Potomac Yard Metrorail Station is in the City of Alexandria and Arlington County, Virginia, located in the Northern Virginia portion of the Washington metropolitan region. The area is bound by U.S. Route 1 (Jefferson Davis Highway) on the west, George Washington Memorial Parkway (a unit of the National Park System) on the east, Slaters Lane on the south, and the Ronald Reagan Washington National Airport Access Road on the north.

The construction of a Metrorail station in Potomac Yard was anticipated when WMATA established the *Metrorail Adopted Regional System Plan* in 1968. At the time the Blue and Yellow Line tracks were built, the area was occupied by the Richmond, Fredericksburg & Potomac (RF&P) Railroad Potomac Yard, and a station was not justified by WMATA. Metrorail planners identified the site for a station to be added later, and the *Final Environmental Impact Statement, Metropolitan Washington Regional Rapid Rail Transit System* (August 1975, p. 188) cites the provision for a future station at Potomac Yard, although at the time, the City of Alexandria decided to proceed with a station near existing development further south at Braddock Road. Beginning in the late 1980s, the rail yard was phased out, and the area was being considered for redevelopment. By 1992, the existing rail yard was rezoned to allow for redevelopment, and, by the late 1990s, commercial stores were built, followed by residential units, office space, retail, and park space. The commercial stores on the northern portion of the site within the City of Alexandria were intended as an interim use, until demand was sufficient for higher-density uses. Currently, portions of Potomac Yard are still under development, either under construction or planned for higher-density mixed-use redevelopment in the coming years.

Since removal of the former rail yard, multiple plans have included construction of a Metrorail station in Potomac Yard to serve new development. A potential Potomac Yard Metrorail Station was included in WMATA’s 1999 *Transit Service Expansion Plan*, the 2010 *Financially Constrained Long-Range Transportation Plan for the National Capital Region* (CLRP), and earlier WMATA and regional transportation plans. A Metrorail station at Potomac Yard was also included in the City of Alexandria’s 1992 and 2008 *Transportation Master Plans* and 2010 *North Potomac Yard Small Area Plan* (NPYSAP).

48 **Figure 1-1: Project Study Area**



50 1.3 Project Purpose and Need

51 Project Purpose

52 The purpose of the project is to improve local and regional transit accessibility to and from the Potomac Yard
53 area adjacent to the U.S. Route 1 corridor for current and future residents, employees, and businesses.

54 Project Need

55 Currently, the project area is not served by direct access to regional transit services. Although several local bus
56 lines serve Potomac Yard and connect to other bus and rail transit services, the project area lacks convenient,
57 direct access to transit that crosses multiple jurisdictions of the metropolitan area and provides frequent, higher-
58 speed, and all-day service. Such premium regional transit serves trips to/from key destinations and travel corridors
59 across the metropolitan area by providing direct or connecting service with widely spaced stations and generally
60 dedicated right-of-way, separated from general vehicular traffic. Regional transit service thus provides quicker and
61 more reliable travel times and fewer transfers for longer trips than local service or transit lines without dedicated
62 right-of-way.

63 The initial segment of the Crystal City/Potomac Yard (CCPY) Transitway (also known as Metroway) opened in
64 August 2014. Metroway is a premium bus service that serves riders along the U.S. Route 1 corridor between the
65 Braddock Road and Crystal City Metrorail Stations and operates in bus-only lanes for the most congested
66 portions of the route. The second phase of the project, which will provide dedicated bus-only lanes along
67 segments within Arlington County and extend the route to the Pentagon City Metrorail Station, is currently under
68 construction. The existing transitway and its future extension will improve reliability and travel times of local bus
69 transit services along the corridor. However, direct access to a regional system of premium transit services is
70 still needed to enhance accessibility and mobility to and from the area via longer transit trips, both for existing
71 travel demand and to support the City of Alexandria's planned redevelopment of Potomac Yard, which will
72 include a major transit-oriented, mixed-use activity center. A direct connection to the regional transit network
73 would also enhance local transit services by providing a transfer point within the Potomac Yard area.

74 According to the Metropolitan Washington Council of Governments (MWCOC) *Round 8.1 Cooperative Forecast*,
75 the population of Alexandria is expected to grow by 35 percent over the next 30 years, while the population of
76 the Northern Virginia area as a whole is expected to grow by 41 percent. Within the same time period,
77 employment in Alexandria is expected to grow by 46 percent, while Northern Virginia as a whole will experience
78 a 53 percent increase in employment. This growth would result in increased vehicle miles traveled (VMT) and
79 congestion; the transportation study conducted as part of the *North Potomac Yard Small Area Plan* (NPYSAP)
80 indicates that traffic congestion will increase on U.S. Route 1 even without the proposed development in
81 Potomac Yard. Increasing the share of transit trips would help to manage congestion, reduce auto trips and
82 emissions along transit corridors, and make efficient use of existing infrastructure.

83 The study area includes and is located adjacent to existing residential neighborhoods and includes an
84 approximately 600,000 square-foot retail center. In 2010, the Alexandria City Council approved the NPYSAP,
85 which guides redevelopment of the existing retail center into a dense walkable urban environment with a mix of
86 uses supported by new local and regional transit services. The NPYSAP plans for 7.525 million square feet of
87 mixed-use development, including office, retail, residential, and hotel uses supported by a proposed Metrorail
88 station located east of North Potomac Yard and the CSXT tracks, just north of the Potomac Greens
89 neighborhood (approximate location of Build Alternative B considered in the Draft EIS and the Preferred
90 Alternative described in **Chapter 2 Alternatives Considered**). If a Metrorail station is not constructed or is
91 constructed in a different location, then the NPYSAP and adopted zoning reduce the allowable development
92 volume in North Potomac Yard by as much as 3.8 million square feet to a total of 3.7 million square feet.
93 Properties in the South Potomac Yard redevelopment area are approved for a total of approximately 5.1 million
94 square feet of development, much of which has already been constructed.

95 Thus, the planned redevelopment of Potomac Yard will impact the existing roadway network with increased
96 travel demand resulting in additional vehicle and transit trips. The *Potomac Yard Multimodal Transportation*
97 *Study* (City of Alexandria, 2010) found that the CCPY Transitway and expanded bus service by themselves
98 would not be able to accommodate the expected increase in travel demand from the fully-built urban activity
99 center envisioned in the NPYSAP. Thus, direct access to frequent, higher-speed regional transit is also needed
100 to accommodate the expected travel demand.

Further expansion of the roadway network in the project area to accommodate local and regional trips is limited by the heavy rail tracks to the east, a pedestrian-friendly urban street grid within Potomac Yard, and existing residential neighborhoods along the west side of U.S. Route 1. Due to the constrained capacity of the roadway network, additional transportation options are needed to support the City of Alexandria's redevelopment plans by accommodating travel demand through transit and other non-auto modes. Direct regional transit access would provide more transportation choices for residents and workers and would enhance connections to regional employment and activity centers.

1.4 National Park Service Proposed Action

As described in the introduction, the proposed Federal action of NPS is to consider issuance of a permit for the temporary use of land under its administration for construction staging and the exchange of property for the proposed permanent use of a portion of that land for the project.

The purpose of the Federal action by NPS is to respond to FTA's proposed project, considering the purpose and resources of the George Washington Memorial Parkway (GWMP) and its accompanying administered properties, as expressed in statute, regulation, and policies.

The Federal action by NPS is needed because the applicant has requested an exchange in properties and submitted preliminary plans to construct and operate a new Metrorail station at Potomac Yard. The project would require NPS to issue a permit for the temporary use of land under its administration for construction staging and undertake the exchange of property for the proposed permanent use of a portion of that land for the project. Construction would require a temporary construction staging area within the Greens Scenic Area easement, which is administered by NPS, and the station and realigned track facilities would have permanent visual impacts on the GWMP. NPS will need to consider the project's impacts to natural and cultural resources of the GWMP as part of its action.

2.0 ALTERNATIVES CONSIDERED

This chapter describes the project alternatives considered in the Potomac Yard Metrorail Station Final Environmental Impact Statement (EIS), the planning processes used to identify and develop the alternatives, and the evaluation process used to compare the effects of the alternatives. This chapter is organized as follows:

- **Section 2.1** describes the local planning process which led to the Draft and Final EIS;
- **Section 2.2** discusses the development and refinement of the alternatives considered for the project;
- **Section 2.3** describes the alternatives previously considered in the Draft EIS;
- **Section 2.4** describes the selection of the Preferred Alternative;
- **Section 2.5** describes the No Build Alternative and the Preferred Alternative considered in the Final EIS; and
- **Section 2.6** evaluates the alternatives considered in the Final EIS.

2.1 Local Planning Process

As redevelopment of Potomac Yard has proceeded, various land use and transportation plans have included the addition of a new Metrorail station in the area. The construction of a Metrorail station has typically been included in land use plans as part of the transportation network to accommodate new development.

The Washington Metropolitan Area Transit Authority (WMATA) initially considered construction of a Metrorail station at Potomac Yard during the planning of the Metrorail Regional System. In 1975, the United States Department of Transportation (USDOT), in cooperation with WMATA, released the *Final Environmental Impact Statement, Metropolitan Washington Regional Rapid Rail Transit System*. The Metrorail system Final EIS noted that Metrorail access at Potomac Yard could be beneficial to new industrial development and proposed a station within the vacant tracts of land near Monroe Avenue (now Slaters Lane). However, to serve existing development at the time, the City of Alexandria requested that a station instead be considered farther south at Braddock Road. The station was constructed at Braddock Road rather than at Monroe Avenue.

In the 1960s, the Richmond, Fredericksburg & Potomac (RF&P) Railroad had leased underutilized and vacant land adjacent to Potomac Yard to a private developer, who proposed several plans for redevelopment in the 1960s and 1970s. This land is now occupied by the Old Town Greens and Potomac Greens neighborhoods. In the 1970s, plans for redevelopment included setting aside land for construction of a rapid rail station, but were not executed until later planning efforts and development agreements in the 1990s (described on the following page). During the mid-1980s, several plans were submitted for redevelopment of the Old Town Greens and Potomac Greens site. Concern by citizens groups and the City of Alexandria over the potential impacts of dense development and a new interchange on the George Washington Memorial Parkway (GWMP) led the U.S. Congress to direct the National Park Service (NPS) to conduct an EIS. In 1991, NPS released the *George Washington Memorial Parkway – Potomac Greens Final Environmental Impact Statement*, which evaluated several “protection alternatives,” including acquisition of all or part of the Old Town Greens and Potomac Greens site. No final Record of Decision (ROD) was prepared for the 1991 EIS, as the EIS was prepared in response to a Congressional directive rather than under the National Environmental Policy Act (NEPA), and no final decision document was requested by Congress.

Because a portion of the rail yard in Arlington County had been constructed on fill over waters of the United States, an indenture, granted in 1938, was necessary to allow operation of rail uses on the land parcels. For non-rail uses to occur, the Federal government needed to release the landowner from the requirement to operate rail-related uses on the property. In 2000, as part of a land exchange to allow redevelopment of the Arlington County portion of Potomac Yard and negate the right to build an interchange on the GWMP to serve Potomac Greens, the owner of the property conveyed a perpetual scenic easement (known as the Greens Scenic Area easement) to the United States Department of the Interior for much of the land to the north of the Potomac Greens neighborhood and east of the Metrorail tracks. The scenic easement was created “...for the purpose of conserving and preserving the natural vegetation, topography, habitat and other natural features now existing within the Greens Scenic area” (Release Agreement and Scenic Easement, Title Document #000005341, p.0029). NPS administers the easement. See **Appendix G** for additional information and title documents relating to the Greens Scenic Area easement.

The rail yard was decommissioned in 1989, and environmental remediation of the site was undertaken by the United States Environmental Protection Agency (USEPA) as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also referred to as “Superfund”) Removal Action during the 1990s and early 2000s. As preparations to decommission the rail yard continued, planning began for eventual re-use of the site and surrounding properties. In the mid-1980s, the City of Alexandria drafted the *Alexandria 2020* plan, which introduced the first proposal for a mixed-use, neighborhood development for Potomac Yard. The plan proposed a site for a Metrorail station near the center of the yard; however, the plan was never formally submitted to the Alexandria City Council for approval.

The City adopted the *Potomac Yard/Potomac Greens Small Area Plan* (PYGSAP) in 1992. A Coordinated Development District (CDD), which is a new zoning district specific to the development, was adopted in accordance with the plan, which permitted approximately 8.8 million square feet of development in Potomac Yard. A number of development proposals, including a proposed professional football stadium and a new U.S. Patent and Trademark Office, were proposed for the site between 1992 and 1999. In 1995, the northernmost portion of Potomac Yard within the City of Alexandria (what is now known as North Potomac Yard or Landbay F) was developed as a retail shopping center (the existing Potomac Yard Shopping Center) in accordance with the CDD. The PYGSAP was revised in 1999, and Potomac Yard was rezoned as CDD #10, which allowed for 6.4 million square feet of development, including the existing 600,000 square feet of retail uses in North Potomac Yard (Landbay F).

The PYGSAP planned a Town Center, focused on East Glebe Road, surrounded by a network of open spaces and neighborhoods west of the CSXT and Metrorail tracks and provided for the development of the Old Town Greens and Potomac Greens neighborhoods east of the tracks. The planning process for the PYGSAP identified the potential for a Metrorail station on the existing Metrorail line at a straight section of track roughly east of Raymond Avenue in the area adjacent to the Town Center and Potomac Greens. The plan also established CDD guidelines for Potomac Yard/Potomac Greens (*amended by Ordinance #4076 October 16, 1999*) that state that CDD development shall not preclude the possible future construction of a Metrorail station. Development Condition 30(A) for CDD #10 expressly contemplates the construction of a Metrorail station and related infrastructure at Potomac Yard. In accordance with this CDD Development Condition, Development Special Use Permit (DSUP) #2002-0026 as approved for Potomac Greens required the reservation of the Metrorail station area. The reservation area for the Metrorail station was identified on the Potomac Greens site plan and ultimately dedicated to the City of Alexandria in 2004.

The area set aside for a station has become known as the Metrorail Reservation. The Metrorail Reservation includes land in Potomac Greens Park, Rail Park, Potomac Yard Park, and the WMATA right of way.

In 2008, the City of Alexandria created the Potomac Yard Planning Advisory Group (PYPAG) to evaluate land use density and zoning for North Potomac Yard. In coordination with the PYPAG, the City also formed a Metrorail Station Feasibility Work Group to evaluate the technical elements related to a potential Metrorail station. These advisory committees played an important role in identifying additional Metrorail station locations and contributed to the studies described in more detail below.

In the *Potomac Yard Metrorail Station Concept Development Study* (2010), the City of Alexandria and WMATA collaborated to identify, examine, and screen potential locations for a Potomac Yard Metrorail station. The study analyzed eight potential locations. The study included conceptual site plans and station layouts for many of the studied alternatives, but ultimately recommended further examination of only Alternatives A, B2, and B3 (shown in **Figure 2-1**).

Also in 2010, the City of Alexandria adopted the *North Potomac Yard Small Area Plan* (NPYSAP) and associated CDD, which are intended to guide redevelopment of the area currently occupied by the Potomac Yard Shopping Center. The plan supersedes the PYGSAP in the North Potomac Yard area, and a new CDD #19 was adopted for the site. The NPYSAP envisions the replacement of the retail center with a high-density, transit-oriented neighborhood, connected by a multi-modal transportation network which includes a Metrorail station. The mixed-use development includes office, retail, residential and hotel uses, and permitted building heights range from 50 feet to 250 feet. A total of 7.525 million square feet of development in North Potomac Yard (Landbay F) is permitted if a Metrorail station is constructed at the location designated in the plan. If no Metrorail station is built or if the Metrorail station is built at an alternate location from the specified plan, then the approved development volume would be reduced to 3.7 million square feet and would require re-planning for the Small Area Plan and amendments to CDD #19. The NPYSAP notes that a station at the B2 or B3 locations would best serve the intent and vision of the plan. This recommended station location, the NPYSAP notes, is

subject to coordination among stakeholders, resolution of environmental issues, and consideration of alternatives under a NEPA process:

The implementation of the Metrorail station will require coordination with WMATA, the National Park Service, Federal highway and transit agencies, CSX, and adjoining developers. Issues to be resolved include impacts on the NPS scenic easement, the George Washington Memorial Parkway, and delineation and mitigation of potential impacts to wetlands and floodplains. The developer will be required to contribute substantially to the financing of the construction of the Metrorail station, and special tax districts in all of the Potomac Yard CDDs will be necessary. It is required that federal environmental review processes be followed and that a final station location will not be established until these review processes are completed. (City of Alexandria, NPYSAP, 2010, p. 58)

Two separate Memoranda of Understanding (May and June 2010) between the City of Alexandria and Potomac Yard developers provided for partial financing of the Metrorail station (in the Preferred Alternative location), associated easements, and other provisions (see City of Alexandria Potomac Yard Memoranda of Understanding, Volume II).

The City of Alexandria also continues to pursue Federal funding to support the project. Because the project has the potential to utilize Federal funds, the Federal Transit Administration (FTA) is the lead Federal agency for the project.

Current plans and zoning approvals in effect for Potomac Yard are described in **Section 3.4 Land Use and Zoning** (page 3-29) and **Section 3.5 Consistency with Local Plans and NPS Policies** (page 3-34).

2.2 Screening Process

Subsequent development and screening of project alternatives has been conducted in accordance with NEPA and other laws and regulations subject to Federal agency review. Throughout the NEPA process, the City of Alexandria has consulted with the Federal Transit Administration (FTA) and the National Park Service (NPS), as well as other relevant Federal and state agencies, in an effort to ensure project compliance with NEPA, Section 4(f) of the U.S. Department of Transportation Act, Section 106 of the National Historic Preservation Act, and other applicable laws (see **Section 4.1 Agency Coordination** on page 4-1).

2.2.1 Alternatives Identified During the EIS Scoping Process

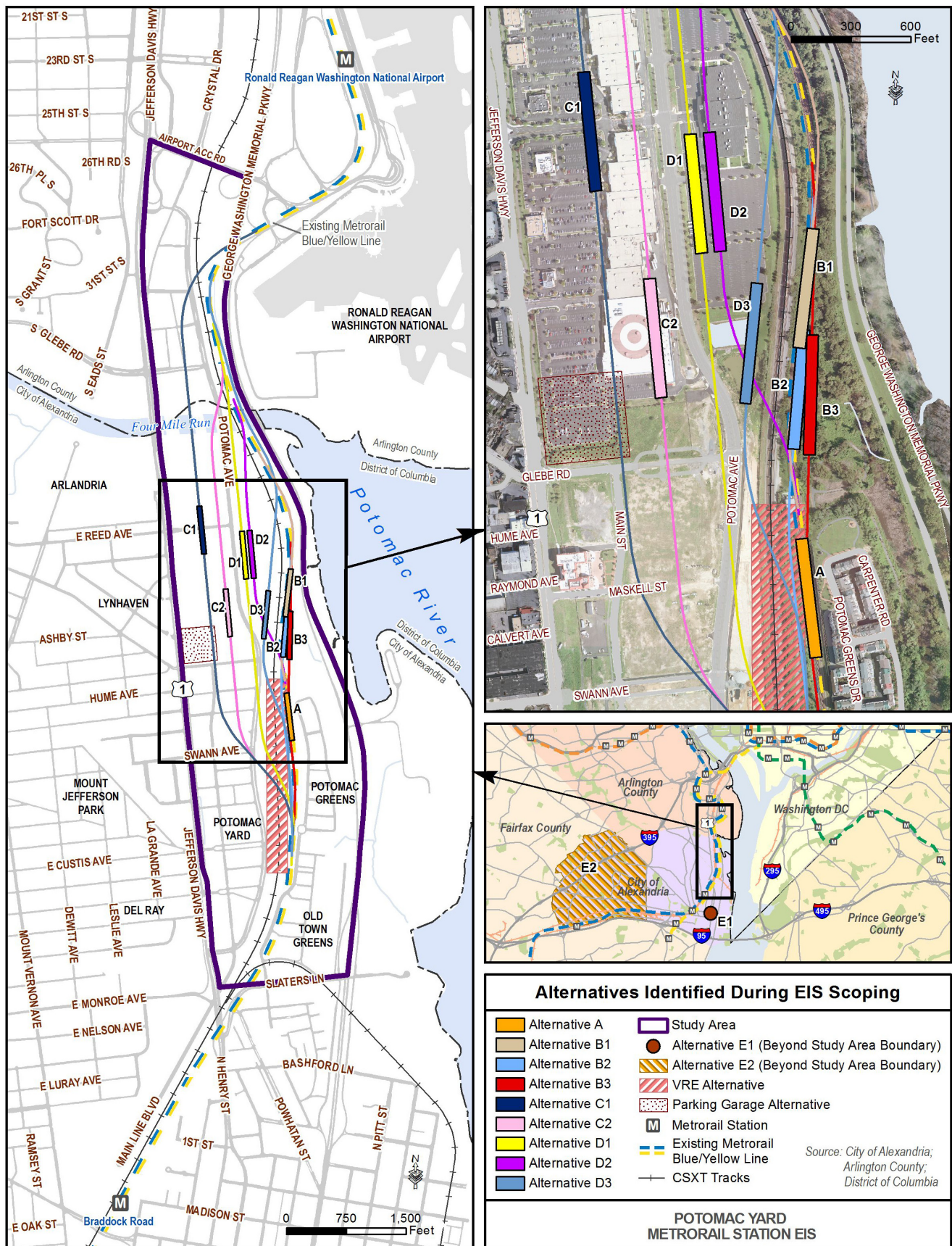
As noted in **Section 2.1**, The *Potomac Yard Metrorail Station Concept Development Study* identified potential locations for a Metrorail station in Potomac Yard. All eight alternatives identified during the *Concept Development Study*, in addition to a No Build Alternative, were advanced into the scoping phase of the EIS for consideration as part of the NEPA environmental review. The purpose of re-introducing alternatives dismissed as part of the *Concept Development Study* was to allow for consideration of a full range of alternatives during the scoping phase. These alternatives were presented to governmental agencies and the general public for review and comment during the scoping process and at scoping meetings.

For the purposes of the scoping process, each of the Build Alternatives included three potential station options (underground, at-grade, and aerial). These Metrorail station alternatives, referred to during the scoping process as Metrorail Station Alternatives A, B1, B2, B3, C1, C2, D1, and D2, are shown in **Figure 2-1**.

During and after the public and agency scoping meetings, scoping participants suggested several new alternatives, also shown in **Figure 2-1**. The scoping meetings are summarized in the *Scoping Summary Report* (June 2011) which is included in Volume II of the *Potomac Yard Metrorail Station Final EIS*. Based on comments received during scoping, the following alternatives were added for consideration:

- **Metrorail Station Alternative D3**, defined as a Metrorail station located in Potomac Yard west of the CSX Transportation (CSXT) tracks;
- **Metrorail Station Alternative E1**, defined as a Metrorail station located in Old Town Alexandria;
- **Metrorail Station Alternative E2**, defined as a Metrorail station located in the West End of Alexandria;
- **The VRE Station Alternative**, defined as a new Virginia Railway Express (VRE) commuter rail station at Potomac Yard, located at-grade along the existing CSXT tracks;

150 **Figure 2-1: Alternatives Identified During EIS Scoping**



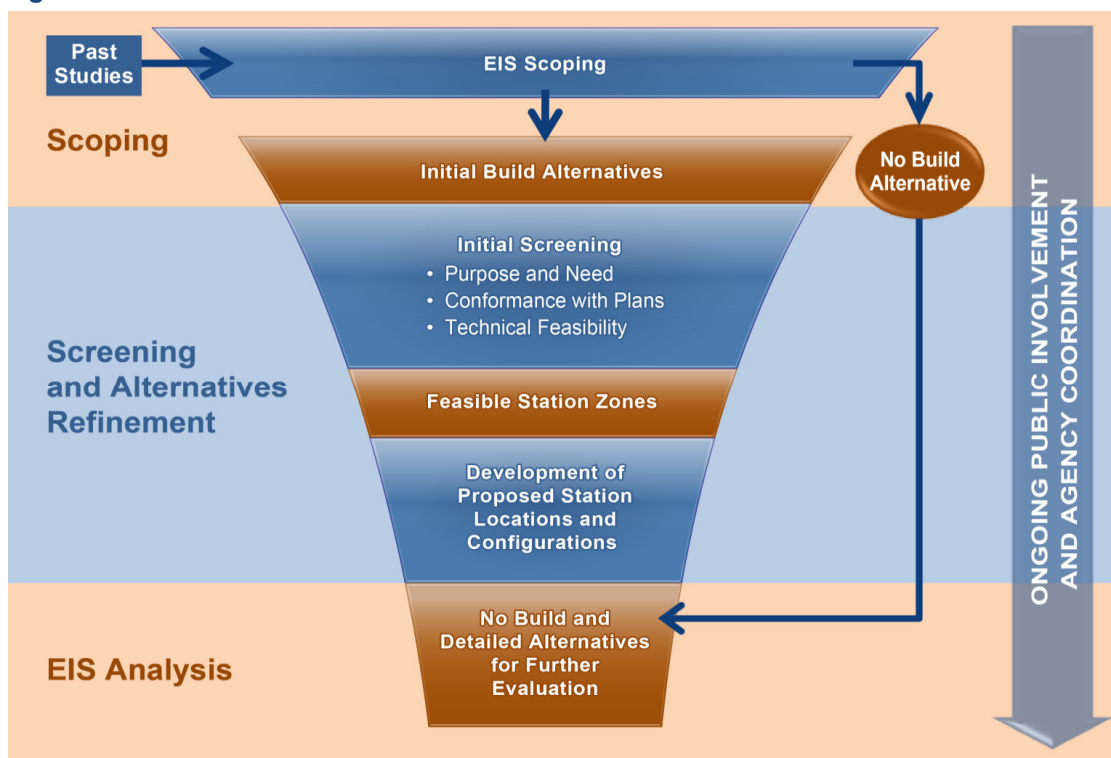
- **The Bus Alternative**, defined as changes to area bus routes and improvements to the transportation network to support increased trips within the corridor and improve access to existing stations of the regional Metrorail system. This alternative would include enhancements beyond those included in the No Build Alternative; and
- **The Parking Garage Alternative**, defined as construction of a parking deck located along U.S. Route 1 to accommodate trips with a destination in Potomac Yard.

The screening process evaluated a total of 36 Build Alternatives. All Build Alternatives presented and suggested during the scoping process were considered in the initial screening.

2.2.2 Screening and Alternatives Refinement

Each proposed Build Alternative documented in **Sections 2.3 and 2.5** is the result of a multi-step process intended to develop a reasonable range of alternatives to be evaluated in the EIS. This evaluation framework is shown in **Figure 2-2**.

Figure 2-2: Refinement of Alternatives



Each alternative detailed in previous applicable studies was carried through the scoping phase, as described in **Section 2.2.1**. These alternatives, as well as the new alternatives suggested during the scoping process, were then carried through an initial screening and refinement of alternatives. This process assessed each alternative based on the following criteria:

1. Responsiveness to project purpose and need;
2. Consistency with land use and development plans; and
3. Technical feasibility.

2.2.2.1 Initial Alternatives Unresponsive to Purpose and Need

Five alternatives – the Bus Alternative, Metrorail station Build Alternatives E1 and E2, the VRE Station Alternative, and the Parking Garage Alternative – did not pass the initial screening because they did not respond to the project purpose and need as follows:

- **Bus Alternative** – improves local transit accessibility, including connecting service to regional transit stations outside of Potomac Yard, but does not provide direct regional transit access to and from the Potomac Yard area;

- **Metrorail Station Build Alternatives E1 and E2** – provide direct regional transit access, but do not serve the Potomac Yard area;
- **VRE Station Alternative** – provides direct regional transit access to the Potomac Yard area, but would only serve a small portion of existing and potential transit users due to the limited service of commuter rail (serves only peak period, peak-direction commuter trips); and
- **Parking Garage Alternative** – does not improve local or regional transit accessibility of the Potomac Yard area.

2.2.2.2 Initial Alternatives Inconsistent with Land Use and Development Plans

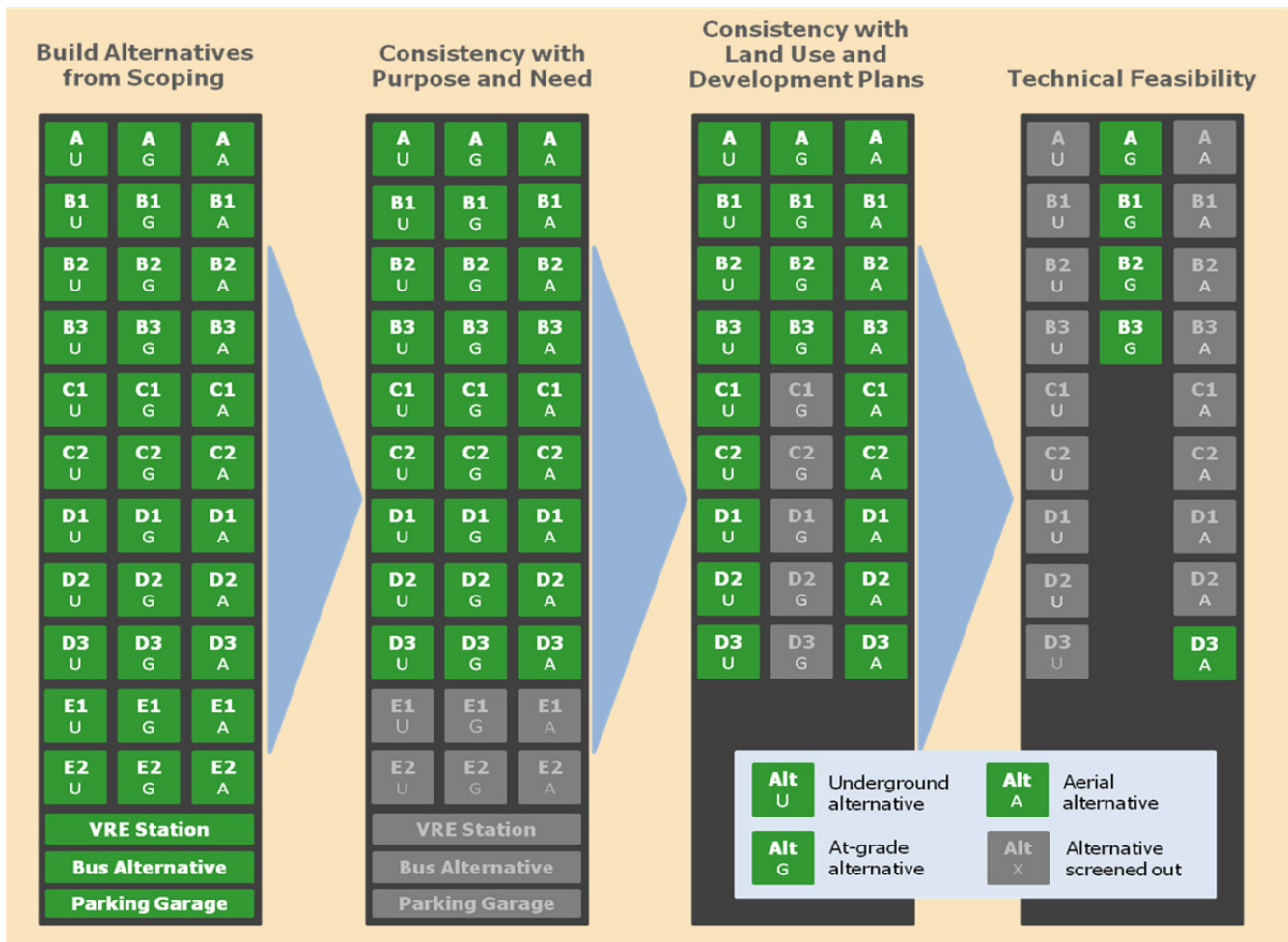
An additional five alternatives – at-grade Metrorail station Build Alternatives C1, C2, D1, D2, and D3 – did not pass the initial screening because they were not consistent with land use and development plans. This criterion assessed general consistency with the goals of these plans to create a high-density, pedestrian-friendly mixed-use community in Potomac Yard; alternatives were not screened out due to their specific locations within the Potomac Yard area. These alternatives would have made the implementation of the Potomac Yard small area plans impossible by blocking many planned street and sidewalk connections and requiring at-grade crossings (bridges or tunnels) over the Metrorail right-of-way, effectively dividing Potomac Yard into two parts.

2.2.2.3 Initial Alternatives Technically Infeasible

Finally, nine alternatives – the aerial and underground options for Alternatives A, B1, B2, B3, C1, C2, D1, and D2, and the underground option for Alternative D3 – did not pass the initial screening because they were not technically feasible. Technical feasibility criteria included: maximum grade, clearance over the CSXT right-of-way, horizontal clearance from the CSXT right-of-way, minimum spacing for constructability between existing and new track, and the amount of straight track required for a station.

The screening process and results are illustrated in **Figure 2-3**.

Figure 2-3: Initial Screening Process Results



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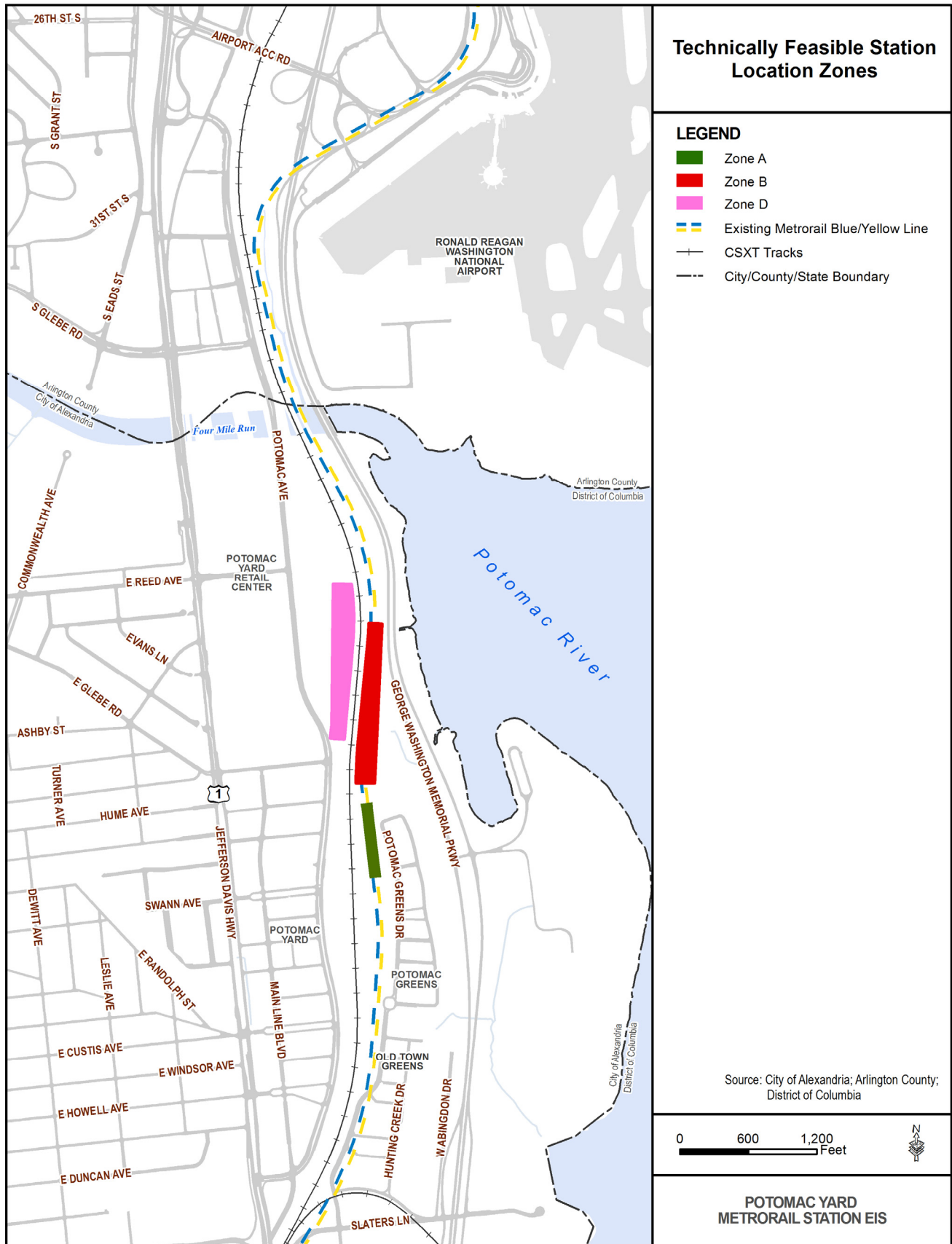
2.2.2.4 Refinement of Feasible Alternatives

As a result of the initial screening of alternatives, five Metrorail Station Build Alternatives – Alternatives A, B1, B2, B3, and D3 – were identified as potentially feasible location options for a Potomac Yard Metrorail Station. However, the screening process also determined that there could be numerous variations in the precise layouts and locations of these five general alternatives. Therefore, “feasible station zones” that could accommodate Alternatives A, B, and D3 were identified for further analysis. These technically feasible station zones are shown in **Figure 2-4**. For additional information regarding this portion of the screening process, see the *Initial Screening of Alternatives* report (October 2011) in Volume II.

After the initial screening, station locations were identified within each of the feasible zones that minimize the potential for adverse social, environmental, and economic impacts, while maximizing the potential benefits of a Metrorail station. The size, location, and configuration of the station and associated facilities were determined for each of the alternatives based on technical considerations to minimize track length and complexity; minimize impacts to existing Metrorail facilities; maintain track alignment geometry in accordance with WMATA standards; and comply with CSXT standards for vertical and horizontal clearance. In addition to technical considerations, the station location for each alternative considered NPS property boundaries, wetlands, approved plans, land ownership, construction impacts and access, and potential ridership capture. For additional information, see the *Refinement of Alternatives, Constructability, and Construction Staging Report* (March 2012) in Volume II.

The station locations within each zone were chosen to maximize access to the existing and planned development in Potomac Yard, minimize impacts to the Greens Scenic Area easement administered by NPS to the north of Potomac Greens, and minimize impacts to wetlands. The Build Alternatives considered in the Draft EIS were developed based on these considerations and are described in detail in **Section 2.3** (page 2-9).

225 **Figure 2-4: Technically Feasible Station Location Zones**



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2.2.3 Alternatives Identified After the EIS Scoping Process

The following three additional alternatives were suggested by cooperating and participating agencies for consideration after the EIS scoping process and initial screening of alternatives was complete:

- **CSXT Realignment Alternative** – defined as moving the existing CSXT tracks further to the west to allow a new Metrorail station to be constructed in the existing CSXT right-of-way. The realigned CSXT tracks would be either elevated, at grade, or in a tunnel;
- **New Ferry Service Alternative** – defined as a ferry service along the Potomac River connecting the Potomac Yard area to the District of Columbia; and
- **Streetcar Service Alternative** – defined as a streetcar service along the planned Crystal City/Potomac Yard (CCPY) Transitway.

These additional alternatives are shown in **Figure 2-5**. The same screening process that was applied to the initial set of alternatives during the scoping process was applied to the additional alternatives suggested after scoping.

The elevated and tunnel options for the CSXT Realignment Alternative were eliminated from further consideration based on a review of technical feasibility. With a maximum allowable grade of less than one percent for freight rail, the CSXT tunnel option could not pass underneath the Potomac Yard redevelopment area and Four Mile Run and reconnect with the existing at-grade CSXT alignment within the project study area. Similarly the elevated CSXT Realignment option could not pass over the Potomac Yard redevelopment area with adequate vertical clearance of at-grade street connections and be able to reconnect with the existing at-grade CSXT alignment within the study area. The at-grade CSXT Realignment option was found to be technically feasible and was developed further as a design refinement of Build Alternative B (described further in **Section 2.3**) to assess its potential to avoid and minimize some of the adverse impacts of Alternative B that were found during the environmental impacts evaluation for the EIS.

The New Ferry Service Alternative and Streetcar Service Alternative were eliminated from further consideration because they do not respond to the project purpose and need. The alternatives provide local transit service that connects to regional transit services, such as Metrorail, but do not provide direct regional transit access to and from Potomac Yard.

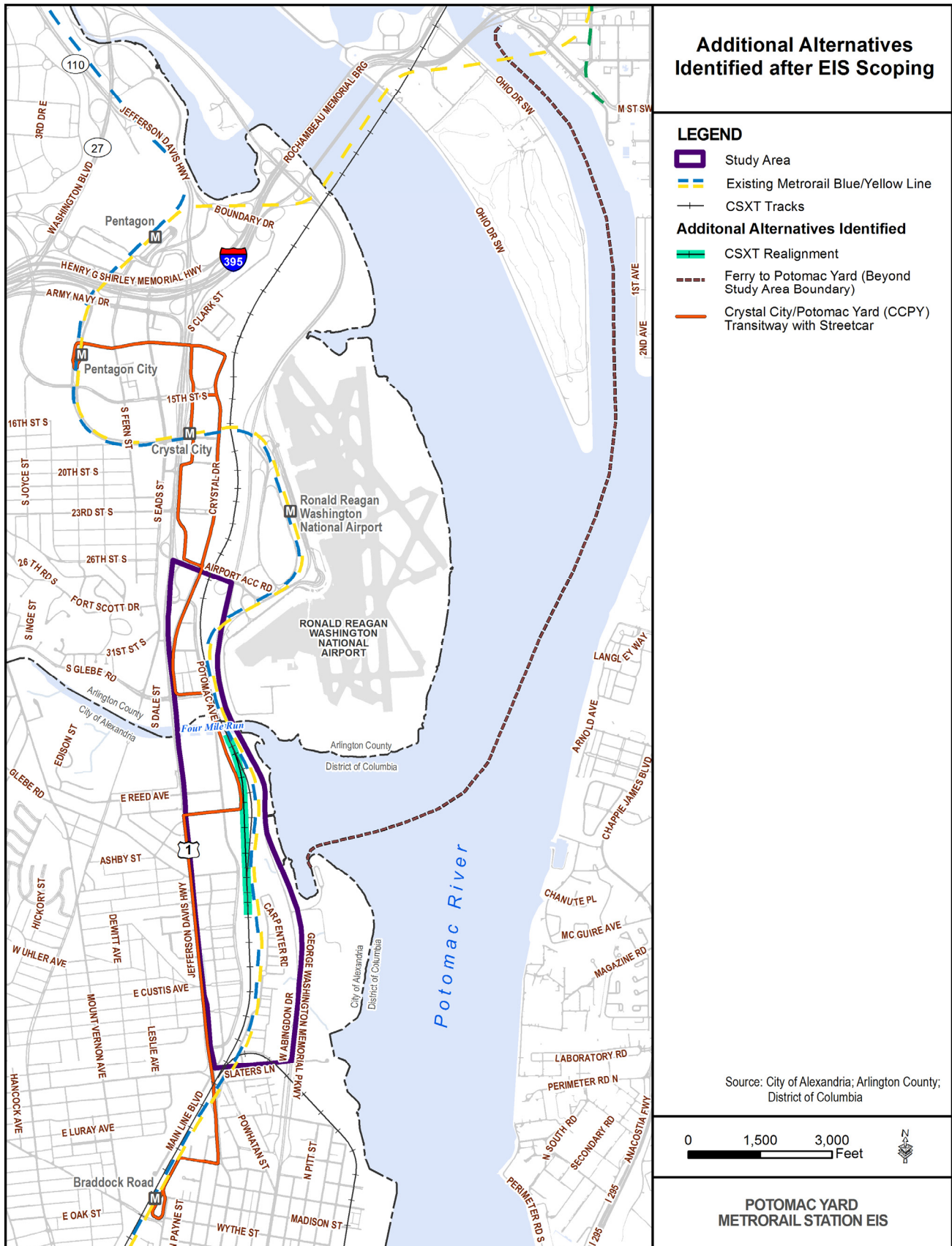
2.3 Alternatives Previously Considered in the Draft EIS

This section describes the No Build Alternative, three Build Alternatives, and B-CSX Design Option that were presented and analyzed in the Draft EIS. These alternatives are briefly presented below; the *Potomac Yard Metrorail Station Draft EIS*, **Sections 2.3** and **2.4** (April 2015) describe these alternatives in detail. The selection of the Preferred Alternative is described in **Section 2.4**, and the alternatives considered and analyzed in the Final EIS are presented in full detail in **Section 2.5**.

2.3.1 No Build Alternative

The No Build Alternative consisted of the existing transportation network, plus all of the committed projects within the study area. The No Build Alternative considered in the Draft EIS is the same as the No Build Alternative considered in the Final EIS, as described in **Section 2.5.1**.

264 **Figure 2-5: Additional Alternatives Identified After EIS Scoping**



2.3.2 Build Alternatives Previously Considered in the Draft EIS

The Draft EIS considered three Build Alternatives and one Design Option of an alternative, as shown in **Figure 2-6**.

- **Build Alternative A** consisted of the construction of a new Metrorail station along the existing Metrorail tracks between the CSXT railroad tracks and the north end of the Potomac Greens neighborhood, generally within the “Metrorail Reservation” identified as part of the *Potomac Yard/Potomac Greens Small Area Plan* (1999).
- **Build Alternative B** consisted of the construction of a new Metrorail station along a segment of realigned tracks, between the GWMP and the CSXT railroad tracks, north of the Potomac Greens neighborhood and east of the existing Potomac Yard Shopping Center. Portions of this alternative were located within the Greens Scenic Area easement, a NPS-administered easement located within the City’s Potomac Greens Park.
- **B-CSX Design Option** was a variation of Build Alternative B and consisted of the construction of a Metrorail station located east of the existing Potomac Yard movie theater on land currently occupied by the CSXT tracks. This design option required the relocation of the CSXT tracks to the west, providing the room necessary for the station and realigned Metrorail tracks to avoid GWMP property and the Greens Scenic Area easement.
- **Build Alternative D** consisted of the construction of a new Metrorail station west of the CSXT railroad tracks near the existing Potomac Yard Shopping Center. This alternative required elevated tracks, starting north of Four Mile Run, crossing over the CSXT tracks into Potomac Yard, and then crossing over the CSXT tracks again to reconnect to the existing Metrorail line near the Potomac Greens neighborhood.

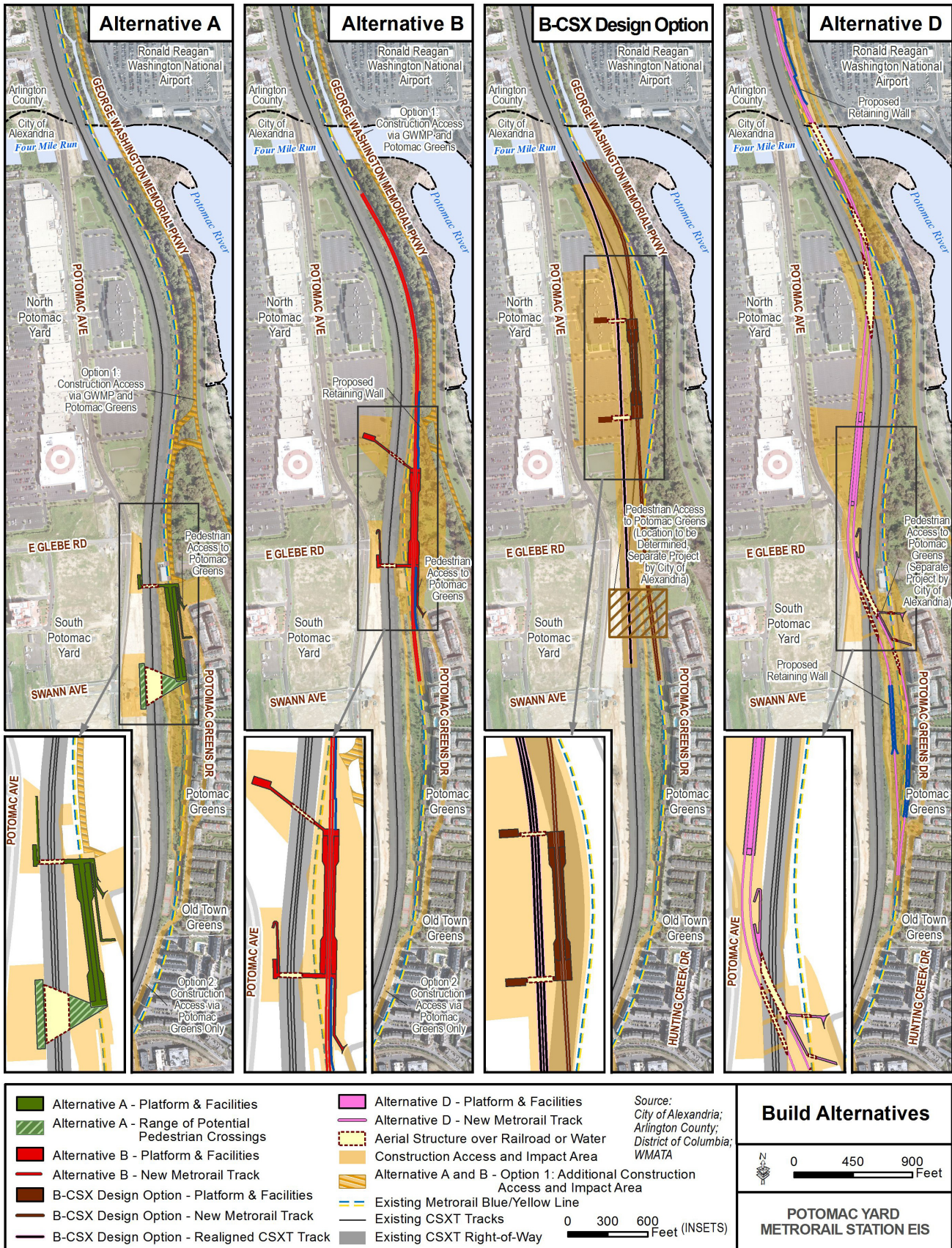
Build Alternatives A and B each included two temporary construction access options.

- **Construction Access Option 1** provided temporary construction access from the GWMP, Potomac Greens Drive, the Rail Park, and relatively limited access from Potomac Yard.
- **Construction Access Option 2** provided temporary construction access from Potomac Greens Drive, the Rail Park, and relatively limited access from Potomac Yard. No access was provided from the GWMP roadway in this option.

Build Alternative D required construction access from the GWMP to construct the realigned track near Four Mile Run, in addition to Potomac Greens Drive, the Rail Park, and Potomac Yard. B-CSX Design Option required construction access only from the Rail Park and Potomac Yard.

Commercial vehicles are prohibited from the George Washington Parkway, with limited exceptions, under *NPS Management Policies 2006* (9.2.2.2.1) and Federal regulations (36 CFR 5.6). The NPS policies state that “commercial traffic will be prohibited on roads within parks, except for the purpose of serving park visitors and park operations”. If access to private lands is otherwise not available, the park Superintendent has the discretion to issue permits for commercial vehicles. After consideration, in May of 2012, NPS stated that use of the GWMP would not be permitted for project construction access. The proposed construction areas for Build Alternatives A and B were accessible from locations other than the George Washington Memorial Parkway. However, since potential impacts would have occurred to residential communities for these alternatives, construction access from the George Washington Memorial Parkway was also studied as an option in the Draft EIS.

306 **Figure 2-6: Build Alternatives Previously Considered in the Draft EIS**



2.3.3 Support for Project Purpose and Need

The project purpose and need is described in detail in **Chapter 1**. To evaluate the extent to which each of the alternatives considered in the Draft EIS supported the project purpose and need the following questions were applied to each alternative:

- Does the alternative improve regional transit accessibility of Potomac Yard?
- Does the alternative expand transportation choices by locating regional transit within walking distance of residents and employees of the Potomac Yard area? Walking distance was defined as ½ mile for residents (a 10-minute walk) and ¼ mile for employees (a 5-minute walk), based on industry experience.
- Does the alternative accommodate travel demand by shifting automobile trips to transit and other non-auto modes? Non-auto mode share is defined as the percentage of trips that are taken on foot, by bicycle, or using transit.

2.3.3.1 Support for Project Purpose: Improving Regional Transit Accessibility

The three Build Alternatives and B-CSX Design Option from the Draft EIS all would support the purpose and need by constructing a new Metrorail station at Potomac Yard that would provide direct access to the regional transit system. Locating a station in Potomac Yard minimizes travel times and transfers by transit to regional destinations served by the system. Although the No Build Alternative improves connecting service to the existing Braddock Road and Crystal City Metrorail Stations via the CCPY Transitway, the Transitway does not provide direct regional transit service to and from Potomac Yard.

2.3.3.2 Support for Project Need: Providing Additional Transportation Choices

All three Build Alternatives and B-CSX Design Option from the Draft EIS would serve planned population and employment growth in the Potomac Yard area by providing an additional transportation option (regional transit with frequent, higher-speed, and all-day service) for residents, employees, and visitors to the area. The majority of the new development within Potomac Yard would be within walking distance of the Metrorail station proposed for the three Build Alternatives and B-CSX Design Option from the Draft EIS. However, Build Alternatives B and D would be located farther north than Build Alternative A and, therefore, would be closer to North Potomac Yard, which is where the densest development, and thus highest concentration of residents and employees, is planned within the Potomac Yard area.

Based on the maximum allowable development, Build Alternative B would be within walking distance of the highest number of residences, as well as offices, shopping, and entertainment destinations, placing the station closest to area residents and employees. Build Alternative B would also enable significantly more office use with a greater percentage of the planned office area located within a ¼-mile walk of the station.

Although Build Alternative D would be located the farthest north and west, the station would occupy land that is currently planned for development, thereby reducing the development potential of North Potomac Yard and resulting in lower levels of new residences and employment uses within walking distance of the station. B-CSX Design Option would have a similar location and effect on development within walking distance of the station as Build Alternative D.

2.3.3.3 Support for Project Need: Increasing the Share of Transit and Other Non-Auto Trips

Build Alternative B would reduce the number of automobile trips with an origin or destination in Potomac Yard by approximately 6,700 daily trips, the largest amount of any of the alternatives considered in the Draft EIS. Build Alternatives A and D and B-CSX Design Option would reduce these automobile trips by approximately 5,000 daily trips. B-CSX Design Option is assumed to have a similar diversion of auto trips to transit as Build Alternative D based on its similar location within Potomac Yard and the associated development volume.

The non-automobile mode share in Potomac Yard is projected to be about 34 percent for each of the three Build Alternatives and B-CSX Design Option from the Draft EIS. For the No Build Alternative, the non-automobile mode share is projected to be 29 percent.

2.3.3.4 Results of Support for Project Purpose and Need Assessment

Because the three Build Alternatives and B-CSX Design Option from the Draft EIS are all located in relatively close proximity to each other, they all support the project purpose and need. However, Build Alternative B performs better than the other alternatives in terms of providing additional transportation choices by locating the station within walking distance of the highest number of residents and employees in the Potomac Yard area.

Build Alternative B also performs better than the other alternatives in terms of reducing the forecast number of automobile trips with an origin or destination point in Potomac Yard.

2.4 Selection of the Preferred Alternative

2.4.1 Locally Preferred Alternative

On May 20, 2015, Build Alternative B, Option 2 Construction Access (No Construction Access from the GWMP) as described in the Draft EIS, was selected by the City of Alexandria as the Locally Preferred Alternative (LPA) for the Potomac Yard Metrorail Project. The City of Alexandria selected the LPA as the alternative that would best meet the project purpose and need. The City Council's selection of the LPA is based on its review of the *Potomac Yard Metrorail Station: Staff Recommendation for the Preferred Alternative* (April 24, 2015) in Volume II and is documented in Alexandria City Council Resolution 2676 (see **Appendix K**). The resolution states that the City Council selected Build Alternative B "to best support the high-density mix of uses envisioned for North Potomac Yard, to support the adjacent communities, and to realize the transportation, economic development, and fiscal benefits." Option 2 Construction Access was selected because use of the GWMP for project construction access (Option 1) would not be permitted.

The City of Alexandria's LPA is FTA's Preferred Alternative, because it would best meet the project purpose and need.

The Preferred Alternative provides a new direct access point to the regional transit system and maximizes potential transit ridership, the shift of automobile trips to other modes, and accessibility to the regional transit system for the greatest number of area residents and employees.

With a projected average weekday ridership of 11,300 boardings by 2040, the Preferred Alternative is projected to attract about 13 percent more riders than the other Build Alternatives considered in the Draft EIS. The Preferred Alternative is also projected to result in a shift of about 6,700 daily automobile trips to transit by 2040 when compared to the No Build Alternative. The Preferred Alternative's projected shift of trips to transit is about 29 percent greater than that of the other alternatives considered in the Draft EIS.

The Preferred Alternative also provides additional regional transit choices to the largest number of residents and employees within walking distance of the station when compared to the other alternatives considered in the Draft EIS. The Preferred Alternative will provide transit access to about 19,800 residents within ½ mile of the station by 2040, which is between 19 percent and 30 percent greater than the number of residents served by the other Build Alternatives considered in the Draft EIS. The Preferred Alternative also provides access to about 24,400 employees within ¼ mile of the station by 2040, which is between 43 percent and 103 percent greater than the number of employees served by the other Build Alternatives.

For Build Alternative B, the Option 1 Construction Access (from the GWMP) would have greater construction and visual impacts to the GWMP compared to Option 2 Construction Access, and NPS policies prohibit commercial traffic, including construction vehicles, on the GWMP. As a result Option 2 Construction Access was selected for the Preferred Alternative.

Given the ability of the Preferred Alternative to best meet the project purpose and need, the City of Alexandria and FTA selected Build Alternative B, Option 2 Construction Access as the Preferred Alternative for the project. Therefore, Build Alternatives A and D, and the B-CSX Design Option, as well as Build Alternative B, Option 1 Construction Access from the Draft EIS are no longer under consideration in the Final EIS.

The No Build Alternative and the Preferred Alternative are further described and analyzed in **Sections 2.5 and 2.6**.

2.4.2 Federal Decision on the Project

No Federal decision on the proposed project will be made or recorded until at least 30 days after publication of a notice in the Federal Register that the Final EIS has been filed with USEPA and is available for public and agency review. After this 30-day review period, FTA and NPS will issue their Records of Decision (RODs) for the project. No action will be taken by an agency or applicant concerning the proposed project that would have an adverse environmental impact or limit the choice of reasonable alternatives before the RODs are issued. However, this no-action period does not preclude the continuation of preliminary planning or design work necessary to support an application for permits or assistance.

The RODs will state the decision regarding the selected alternative for the project; identify the alternatives considered, including the environmentally preferred alternative (which may be the same as the Preferred Alternative or may be another alternative considered); and identify mitigation and monitoring commitments for the project.

If changes are made to the selected alternative after the RODs have been published, additional NEPA analysis may be required. If changes to the project would result in any changes in environmental impact, a supplement to the EIS may be necessary.

The following activities would occur after the RODs are issued by FTA and NPS:

- **Selection of Design/Build Contractor** – WMATA will prepare and issue a Request for Proposals (RFP) from potential contractors to complete the final design and construct the project. WMATA will select the Design/Build contractor based on a technical evaluation of the proposals and criteria established in the RFP, execute a contract with the selected contractor, and provide oversight of the Design/Build contractor.
- **Execution of Land Exchange** – An exchange of land between the United States and the City of Alexandria to accommodate the station will be required. This includes a transfer in ownership of a portion of GWMP property to the City to accommodate connecting tracks for the proposed station and the transfer of City-owned land of equal or better value to the United States for use by NPS.
- **Obtaining Necessary Permits** – The Design/Build contractor will be responsible for obtaining all of the Federal, state, and local permits required to construct the station.
- **Initiation of Construction Activities** – Once the necessary permits are obtained and final design of the station is complete, the Design/Build contractor may initiate construction activities for the project. Construction activities would be required to fulfill mitigation commitments identified in the RODs. These commitments include replacement and restoration of resources adversely affected by the project as outlined in the RODs.
- **Monitoring** – Site monitoring fulfills commitments made in the RODs to verify expected impacts and effectiveness of mitigation measures.

2.5 Alternatives Considered in the Final EIS

This section describes the No Build Alternative and the Preferred Alternative analyzed in the Final EIS.

2.5.1 No Build Alternative

The No Build Alternative would consist of the existing transportation network, plus all of the committed projects within the study area. Analysis of the No Build Alternative is required pursuant to the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1502.14). The No Build Alternative includes planned projects from the following adopted plans and improvement programs:

- *Financially Constrained Long-Range Plan for the National Capital Region (CLRP)*, National Capital Region Transportation Planning Board, 2015 Update;
- *FY 2015-2020 Transportation Improvement Program for the Washington Metropolitan Region (TIP)*, National Capital Region Transportation Planning Board, adopted 2010;
- *City of Alexandria FY 2016-2025 Capital Improvement Program (CIP)*, adopted 2015;
- *Potomac Yard Coordinated Development District Concept Plan*, City of Alexandria, adopted 1999 with amendments through 2010;
- *North Potomac Yard Small Area Plan*, City of Alexandria, adopted by ordinance in 2010; and
- *Coordinated Development District (CDD) #10 and #19*, City of Alexandria, adopted 2010.

Table 2-1 provides a summary of improvements included in the No Build Alternative. Current and future year conditions for the No Build Alternative were used as a basis for identifying the transportation, environmental, and community impacts of the proposed Potomac Yard Metrorail Station Build Alternatives.

The No Build Alternative would include the completion of the internal street network within Potomac Yard, generally from Four Mile Run to Braddock Road, in addition to investments in transit and bicycle/pedestrian facilities.

Transit investments include the completion of the Arlington County portion of the CCPY Transitway, shown in **Figure 2-7**, as well as expansion of local transit service. Local bus service under the No Build Alternative is shown in **Table 2-2**. The future internal street network for North Potomac Yard is shown in **Figure 2-7**. The No Build Alternative also includes a pedestrian bridge over the Metrorail and CSXT right-of-way between Potomac Greens and Potomac Yard.

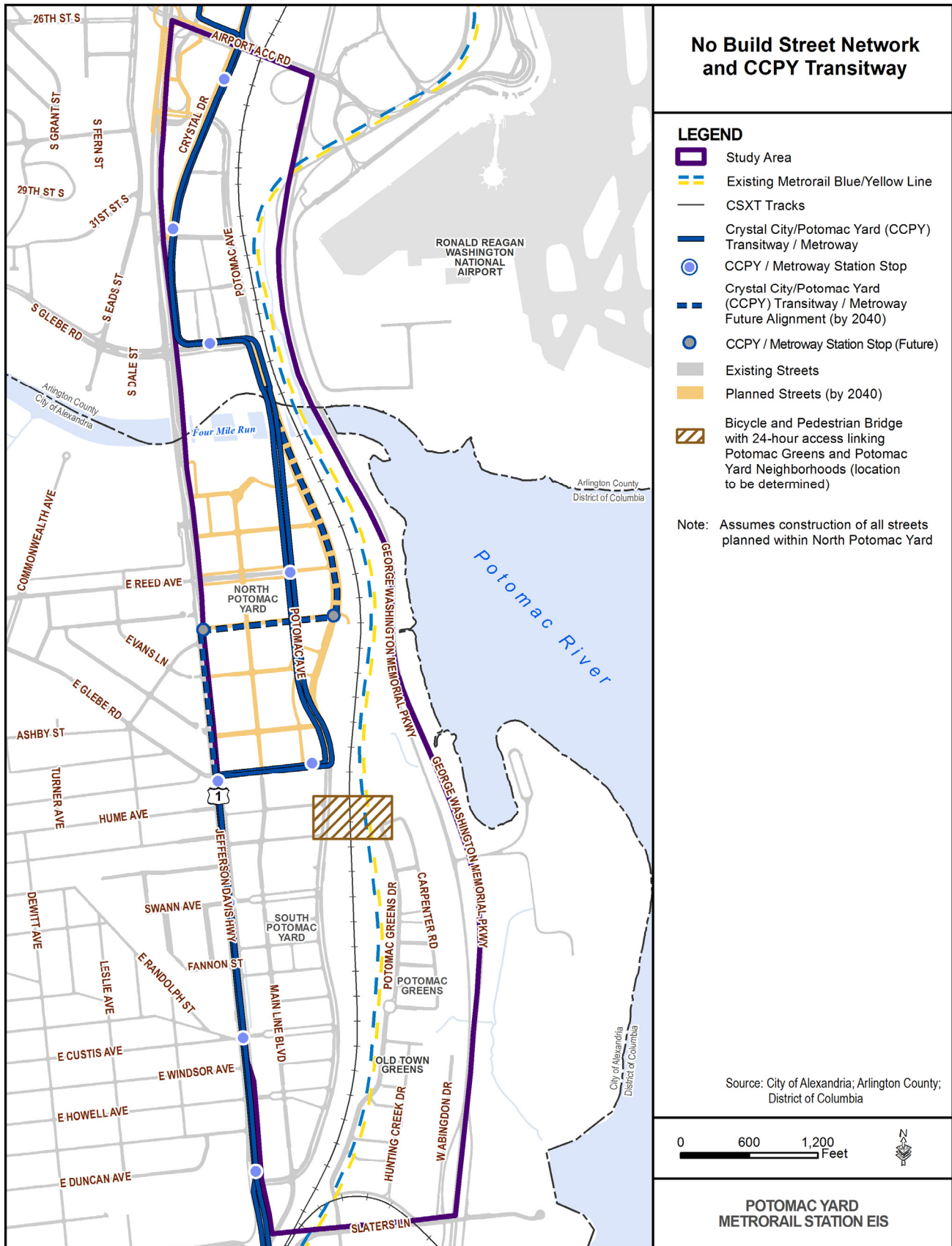
Table 2-1: Projects Included in No Build Alternative

Project	Location	Improvements	Reference
Transit infrastructure improvements			
Crystal City/ Potomac Yard (CCPY) Transitway	Between Braddock Road Metrorail Station and Pentagon City Metrorail Station	Construction of a two-lane transitway to provide high-quality, high-capacity transit service through Potomac Yard and between the Pentagon City, Crystal City, and Braddock Road Metrorail Stations. The portion of the Transitway within the City of Alexandria has been completed.	CLRP, TIP, CIP
Local and Circulator Transit Service	North Potomac Yard	Transit service expansion providing service between Potomac Yard and existing neighborhoods and other destinations.	CIP, NPYSAP
Roadway infrastructure improvements			
Internal Street Network	South Potomac Yard (between U.S. Route 1 and Potomac Avenue)	Construction of an interconnected network of streets, including the development/extension of E. Glebe Road, Swann Avenue, E. Custis Avenue, E. Howell Avenue; and construction of Main Line Boulevard and Maskell Street. Completed.	SAP
	North Potomac Yard (between U.S. Route 1 and Potomac Avenue)	Construction of an interconnected network of streets, including the development/extension of E. Reed Avenue, Evans Lane, and Main Line Boulevard.	NPYSAP
Non-motorized infrastructure improvements			
Bicycle/Pedestrian Facilities	Bicycle and pedestrian bridge connecting Potomac Greens and Potomac Yard neighborhoods	Construction of a bicycle and pedestrian bridge over the existing CSXT Railroad and Metrorail Line providing 24-hour access between Potomac Greens and North and/or South Potomac Yard neighborhoods	SAP
Railroad Improvements			
VRE System Plan	Multiple locations, including the Long Bridge Corridor (between southwest Washington DC and the VRE Station In Alexandria, Virginia)	Long Bridge Corridor updates include adding track capacity to four tracks from current three tracks.	CLRP

References:

CIP = *City of Alexandria FY 2015-2024 Capital Improvement Program*, City of Alexandria, 2014;
 CLRP = *Financially Constrained Long-Range Plan for the National Capital Region*, 2014 Update, National Capital Region Transportation Planning Board, 2014;
 NPYSAP = *North Potomac Yard Small Area Plan*, City of Alexandria, 2010;
 SAP = *Potomac Yard/Potomac Greens Small Area Plan*, City of Alexandria, 1992 (revised 1999 with amendments through 2010); and
 TIP = *FY 2011-2016 Transportation Improvement Program for the Washington Metropolitan Region*, National Capital Region Transportation Planning Board, 2010.

469 **Figure 2-7: No Build Street Network and Crystal City/Potomac Yard Transitway**



470

471 **Table 2-2: No Build Alternative Bus Service**

Route	Primary Alignment in Potomac Yard Area	Span of Service	Service Headway (Minutes)
Metrobus Services			
9A	U.S. Route 1	Weekdays: 4:30 a.m. to 1:30 a.m. Saturday: 5:30 a.m. to 1:30 a.m. Sunday: 5:00 a.m. to 1:00 a.m.	Weekday Peak: 30 Weekday Off-Peak: 30 Saturday: 30 Sunday: 40
10S	U.S. Route 1	Morning: 6:45 a.m. to 8:15 a.m. Afternoon: 5:00 p.m. to 6:00 p.m. (<i>Weekday peak periods and reverse direction only</i>)	Morning: 3 trips (<i>southbound only</i>) Afternoon: 2 trips (<i>northbound only</i>)
11Y	Express Line along GWMP. Only one stop at Slaters Lane/ Abingdon Drive in vicinity of study area.	Weekdays: 6:30 a.m. to 9:00 a.m. and 4:10 p.m. to 7:25 p.m.	Weekday Peak: 30
Metroway	CCPY Transitway	Monday – Thursday: 5:30 a.m. to 10:20 p.m. Friday: 5:30 a.m. to 12:20 a.m. Saturday: 6:30 a.m. to 12:20 a.m. Sunday: 7:30 a.m. to 10:20 p.m.	Weekday Peak: 12 along full route; 6 between Crystal City Metro and S. Glebe Road Weekday Off-Peak: 12-15 Weekend: 20 (all day Saturday and Sunday)
DASH Services			
AT 4	Slaters Lane	Weekday Mornings: 5:50a.m. to 10:10 AM Weekday Afternoons: 3:00 PM to 8:00 p.m.	Weekday Peak: 20
AT 9	E Glebe Road	Weekdays: 6:30 a.m. to 10:00 p.m. Saturday: 6:50 a.m. to 10:20 p.m.	Weekdays: 30 Saturday: 60
AT 10	E Reed Avenue	Weekdays: 6:30 a.m. to 10:30 p.m. Saturday: 6:50 a.m. to 10:30 p.m. Sunday: 8:50 a.m. to 6:40 p.m.	Weekdays: 30 Saturday: 30 Sunday: 60

472 Source: WMATA published schedules, dated March and August 2014 and March and June 2015, and Alexandria Transit Company (DASH) published
473 schedules, effective November 2015.

474 Metrorail service under the No Build Alternative would include the Yellow and Blue Lines, which operate through
475 the study area along an alignment parallel to and just east of the CSXT Railroad. The closest Metrorail stations
476 to the study area will continue to be the Ronald Reagan Washington National Airport (National Airport) Station
477 north of the study area and the Braddock Road Station to the south. The distance between these two existing
478 stations is 3.1 miles.

479 Yellow Line trains are scheduled for 6-minute frequencies in the peak hours and 12- to 20-minute frequencies in
480 the off-peak hours. Blue Line Trains are scheduled for 12-minute frequencies in the peak hours and 12- to 20-
481 minute service in the off-peak hours. The Yellow Line provides service from the Huntington Metrorail Station in
482 Virginia to the Fort Totten Metrorail Station in the District of Columbia. During peak hours, some Yellow Line
483 trains provide service from the Franconia-Springfield Metrorail Station in Virginia to the Greenbelt Metrorail
484 Station in Maryland and some terminate at the Mount Vernon Square Metrorail Station in the District of
485 Columbia. The Blue Line provides service from the Franconia-Springfield Metrorail Station in Virginia to the
486 Largo Town Center Metrorail Station in Maryland. Yellow and Blue Line Service runs from the National Airport
487 and Braddock Road Stations starting at approximately 5:00 am weekdays, and at approximately 7:00 am on
488 Saturday and Sunday. The last train leaves the National Airport and Braddock Road Stations at approximately
489 12:30 am Sunday through Thursday, and at approximately 2:30 am on Friday and Saturday. Metrorail fares are
490 distance-based, and currently range from \$1.75 to \$3.60 in the off-peak, and from \$2.15 to \$5.90 in the peak. An
491 additional \$1 surcharge is added to these fares for riders using paper farecards.

The CSXT rail corridor is expected to expand track capacity from three tracks to four tracks through the Potomac Yard area (known as the “Long Bridge Corridor”). The *VRE System Plan 2040 Study* identifies the expansion as critical to obtain higher volumes of rail traffic and more reliable operations in the future, as two tracks could be dedicated for passenger trains and two tracks for freight trains. The Long Bridge Corridor track expansion is anticipated to be completed between 2021-2030 within the existing CSXT right-of-way. The *VRE System Plan 2040 Study* was approved as part of the October 2014 CLRP Update.

The Long Bridge Corridor is also being assessed as part of the *Long Bridge Study* by the District Department of Transportation (DDOT) in cooperation with the Federal Railroad Administration (FRA) of the freight and passenger rail bridge between the District of Columbia and Virginia. Although the Long Bridge project area extends into Potomac Yard, the improvements are largely planned at the bridge itself and along the bridge approach north of Crystal City. The final report of the *Long Bridge Study Phase 1* was completed in the spring of 2015. *Phase 2* is currently underway by DDOT and includes a long-range service planning activity.

2.5.2 Preferred Alternative

The Preferred Alternative consists of the construction of a new Metrorail station along the existing Blue and Yellow Line in the vicinity of Potomac Yard. The station location and general design of the Preferred Alternative are based on Build Alternative B, Option 2 Construction Access. Refinements were made to Build Alternative B for the Preferred Alternative to incorporate more detailed design considerations and to minimize adverse environmental impacts; these refinements are summarized in **Table 2-3**. The Preferred Alternative is described in detail on the following pages.

Table 2-3: Preferred Alternative Refinements from Build Alternative B

Project Element	Refinements
Station Location	No change
Station Facilities	New utility room building (approximately 65 feet by 42 feet in dimension) added next to the existing WMATA traction power substation to accommodate the AC switchgear room serving the station.
Station/Track Design	Two design options provided for east face of station wall and realigned track: <ul style="list-style-type: none"> Station Design Option 1 – Full Retaining and Station Walls: maintains the design of Build Alternative B from the Draft EIS along the eastern side of the station building and realigned track, as viewed from the GWMP. Station Design Option 2 – Full or Partial Berm: the option replaces the retaining walls with earthen fill and extends these berms along the station wall and under the maintenance access easement around the station to reduce the visual impacts.
Construction Staging and Access	Modifications to planned construction staging areas and access routes: <ul style="list-style-type: none"> Access route through the Potomac Greens neighborhood also includes Carpenter Road; Potomac Greens Park playground, lawn area, and boardwalk trail, and the Old Town Greens tennis courts and playground will be closed to the public for the duration of construction to ensure safe conditions; To allow for potential minor design modifications to the station pedestrian and bicycle access facilities, the extent of the construction staging area and access areas at station entrances is expanded; To minimize impacts to the GWMP, the extent of the construction staging area on the GWMP property is removed except where required for direct access to build the realigned track; a wider area of construction activity immediately north of the station is indicated to accommodate installation of a crossover switch on the realigned track; and Construction staging area within the Rail Park is expanded to accommodate construction contracting offices and reduce vehicular traffic along Potomac Greens Drive by construction employees.

Note: The finalized design of the Preferred Alternative may incorporate elements of both design options. As design refinements are ongoing, additional minor refinements proposed for mitigation of project impacts will be specified in the ROD.

514 The station would be located between the GWMP and the CSXT right-of-way, north of the Potomac Greens
515 neighborhood and east of the existing Potomac Yard Shopping Center (North Potomac Yard) and the CSXT
516 right-of-way. The site is partially within Potomac Greens Park, GWMP parkland, and the Greens Scenic Area
517 easement (administered by NPS).

518 The station would be at-grade with a side platform layout. Additional station facilities would include two
519 pedestrian bridges from the station over the CSXT right-of-way to the existing and planned development in
520 Potomac Yard. The bridge at the southern end of the station would provide 24-hour pedestrian/bicycle access
521 between Potomac Yard and the Potomac Greens neighborhood. The City of Alexandria is required to construct
522 a bicycle and pedestrian bridge over the CSXT Railroad and Metrorail Line to provide 24-hour access between
523 these neighborhoods whether or not a Metrorail station is built in this area.

524 The Preferred Alternative would require the realignment of approximately 650 feet of existing track, as well as
525 the installation of approximately 1,450 feet of new track to provide a straight section of track for the proposed
526 station location and meet other WMATA track design requirements. Special track work – a double crossover –
527 would be required approximately 100 feet north of the station. An area of GWMP property, located just north of
528 the proposed Metrorail station, would be required to accommodate the track connecting the station to the
529 existing Metrorail mainline and the construction access and staging area for the installation of a crossover
530 switch on the realigned track. Depending on the station design option, between 0.16 and 0.33 acre of GWMP
531 property would be permanently required to accommodate the connecting track, and between 0.25 and 0.42 acre
532 of GWMP property would be temporarily used to accommodate construction access and staging (see **Section**
533 **2.5.2.1** on the following page for descriptions of the design options). No access would be provided from the
534 GWMP roadway for either option.

535 A small utility room (approximately 65 feet by 42 feet in dimension) would be added next to the existing WMATA
536 traction power substation to accommodate the AC switchgear room serving the station.

537 The Preferred Alternative would be designed to include standard station elements for an urban Metrorail station
538 without Park & Ride or off-street Kiss & Ride facilities. Bicycle parking facilities would be provided at each
539 station entrance in accordance with Metrorail station access guidelines and design criteria. Other pedestrian and
540 bicycle improvements will be provided in the vicinity of the station as recommended in City of Alexandria plans.

541 Passengers would enter the Preferred Alternative station at the mezzanine level, which would include a station
542 manager's kiosk, fare gates, and fare vendors. Service and ancillary rooms required for electrical, mechanical,
543 and plumbing services would be located between the mezzanine and platform levels.

544 The Metrorail operating plan would differ from the No Build Alternative only in the addition of a station at
545 Potomac Yard. The combined peak headways for the Blue and Yellow Lines would be 3.5 minutes, with
546 combined headways of 6 minutes in the off-peak. Service would run from Potomac Yard Metrorail station
547 starting at approximately 5:00 am weekdays, and at approximately 7:00 am on Saturday and Sunday. The last
548 train would leave Potomac Yard Metrorail station at approximately 12:30 am Sunday through Thursday and at
549 approximately 2:30 am on Friday and Saturday. Fares would be consistent with the rest of the Metrorail system.
550 Metrorail fares are distance-based, and currently range from \$1.75 to \$3.60 in the off-peak and from \$2.15 to
551 \$5.90 in the peak.

552 No new bus routes, in addition to those included in the No Build Alternative, would be added for the Preferred
553 Alternative. As described for the No Build Alternative in **Sections 2.3.1 and 2.5.1**, new planned services, such
554 as the completion of the CCPY Transitway, are expected to be in place, as are planned modifications to existing
555 routes that are intended to serve the new development and street pattern in Potomac Yard. Buses would use
556 stops along the CCPY Transitway (Metroway) route, or other on-street stops, to provide transfer service for the
557 Potomac Yard Metrorail Station. No off-street bus facilities would be added and no modifications to bus routes
558 outside of the Potomac Yard redevelopment area are assumed for the Preferred Alternative. Potential
559 refinements to the designs and locations of on-street bus stops along Potomac Avenue to serve the station and
560 facilitate transfers between Metrorail and bus services, including CCPY Transitway (Metroway), would be
561 considered in coordination with WMATA, the City of Alexandria, and bus service providers during later project
562 design phases.

563 The tracks and ties will remain in place for the segment of the existing Metrorail line that would no longer be
564 needed for Preferred Alternative. Any further action on the existing rail segment bypassed by the Preferred
565 Alternative station would be analyzed under the applicable regulations.

2.5.2.1 Preferred Alternative Station Design Options

For the Preferred Alternative, design refinements are underway to minimize the visual impacts of the building wall on the eastern side of the station and the retaining walls along the realigned track. The following two design options have been identified for consideration in the Final EIS:

- **Station Design Option 1** – Full Retaining and Station Walls: the option maintains the design of Build Alternative B from the Draft EIS along the eastern side of the station building and realigned track. Based on the design of Build Alternative B, the dimensions of the walls are approximately as follows:
 - o Exposed portion of station wall below the level of the Metrorail tracks: approximately 15 feet in height from grade level and 650 feet in length.
 - o South retaining wall: maximum height of 14 feet tapering to 0 feet over the 160 feet in length visible from areas east of Potomac Greens Park. The tapered retaining wall continues south an additional 490 feet behind the lawn area of Potomac Greens Park and the townhomes but not visible from areas to the east of Potomac Greens.
 - o North retaining wall: maximum height of 20 feet, tapering down to the north over the 780 feet in length.

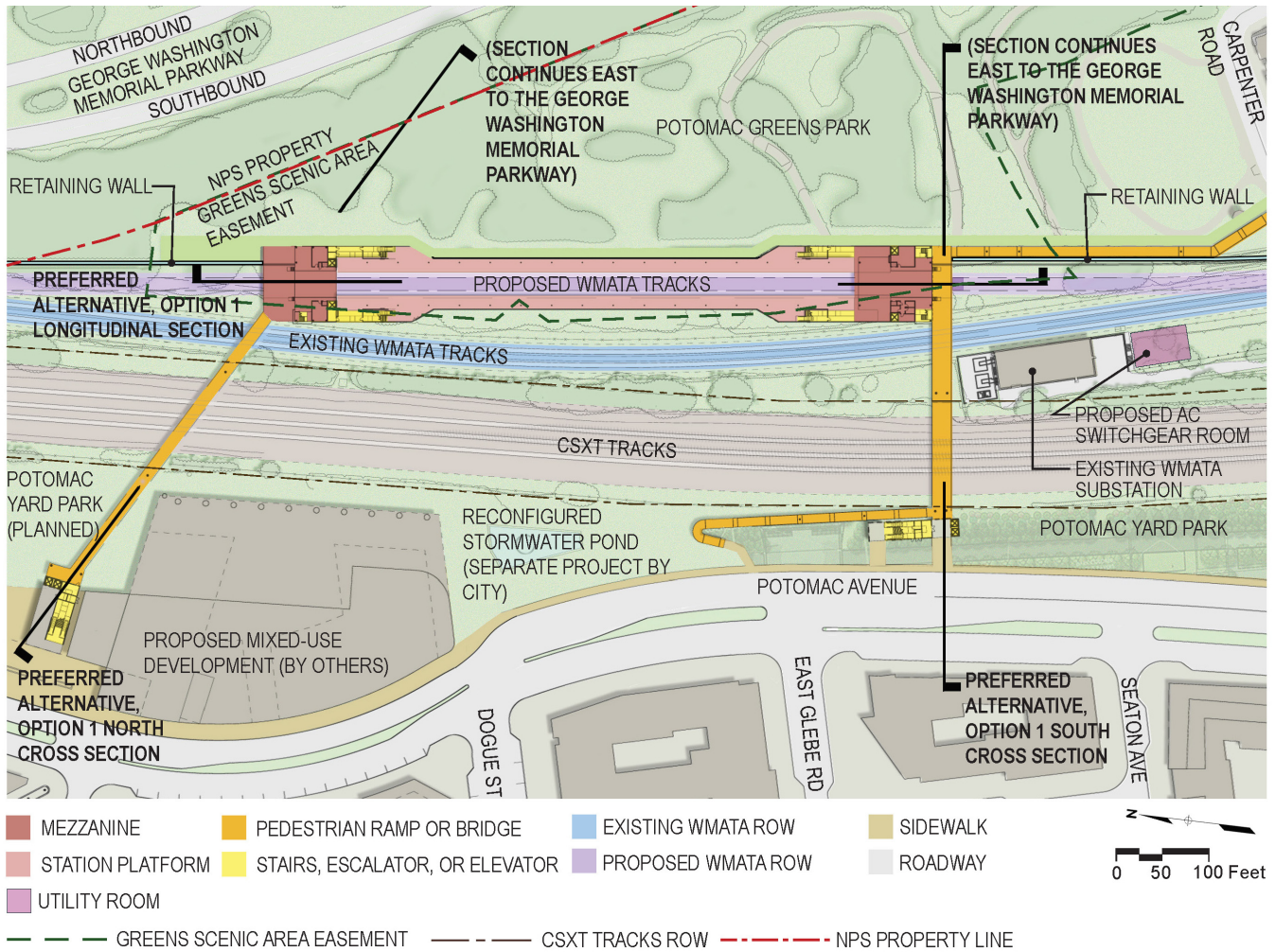
Figures 2-8 through 2-10 show the site plan, cross sections, longitudinal section, and the east elevation for the Preferred Alternative Station Design Option 1.

- **Station Design Option 2** – Full or Partial Berm: the option replaces the retaining walls with earthen fill and extends these berms along the station wall and under the maintenance access easement around the station. This option reduces the visual impact of the station wall by using a vegetated earthen berm to screen the portion of the station structure below the tracks and to support the maintenance access easement and realigned track beds. The earthen berm would be between 15 and 22 feet in height, about 1,800 feet in length, and extend out to the east as much as 17 feet. The exposed east facing retaining wall could vary in height from 1 to 9 feet depending on the height of the earthen berm. This option would increase the footprint of the station and realigned track area within parkland and natural areas along their eastern side compared to Station Design Option 1. The acreages of these higher impacts to specific resources by Station Design Option 2 are reported in Chapter 3.

Figures 2-11 through 2-13 show the site plan, cross sections, longitudinal section, and the east elevation for the Preferred Alternative Station Design Option 2.

The finalized design of the Preferred Alternative may incorporate elements of both design options and would be designed to adhere to the station height limits. As design refinements are ongoing, additional minor refinements proposed for mitigation of project impacts will be specified in the ROD.

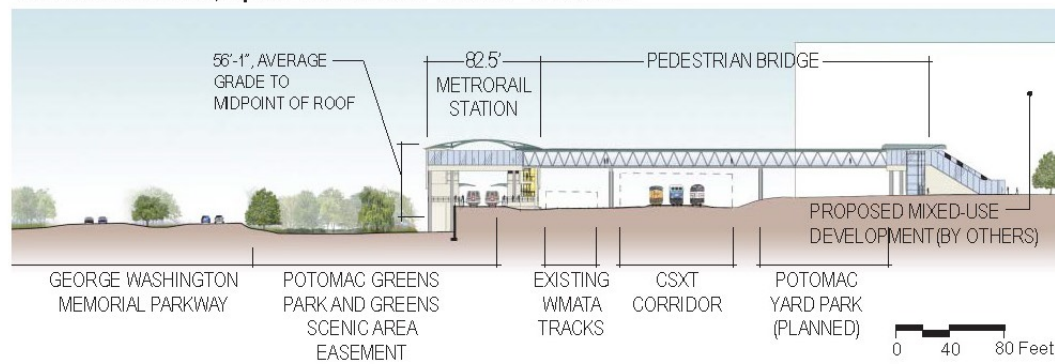
598 **Figure 2-8: Preferred Alternative Station Design Option 1 Plan View**



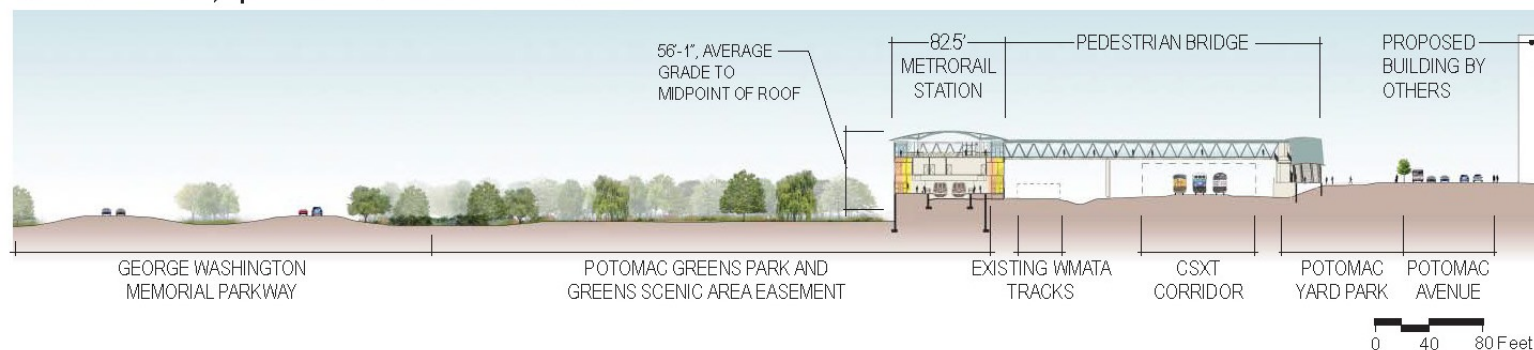
NOTE: THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. THE FINAL DESIGN OF THE STATION, AMENDMENTS TO OPEN SPACE, AND THE PEDESTRIAN BRIDGES WILL OCCUR AS PART OF THE DESIGN-BUILD PROCESS AND WILL REQUIRE ALL APPLICABLE WMATA AND CITY APPROVALS.

600 **Figure 2-9: Preferred Alternative Station Design Option 1 Cross Sections and Longitudinal Section**

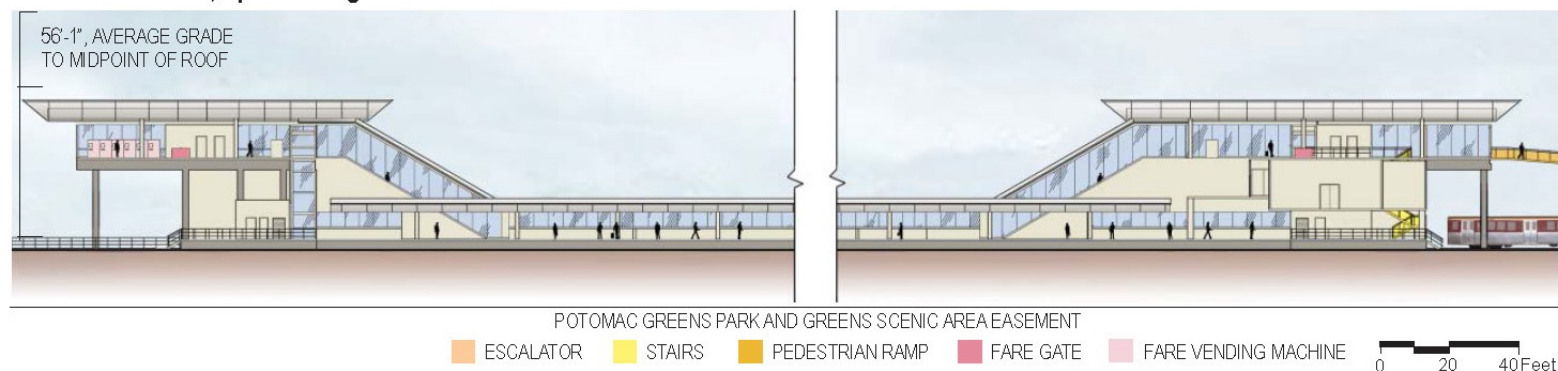
Preferred Alternative, Option 1 North Cross Section - View South



Preferred Alternative, Option 1 South Cross Section - View South



Preferred Alternative, Option 1 Longitudinal Section - View East

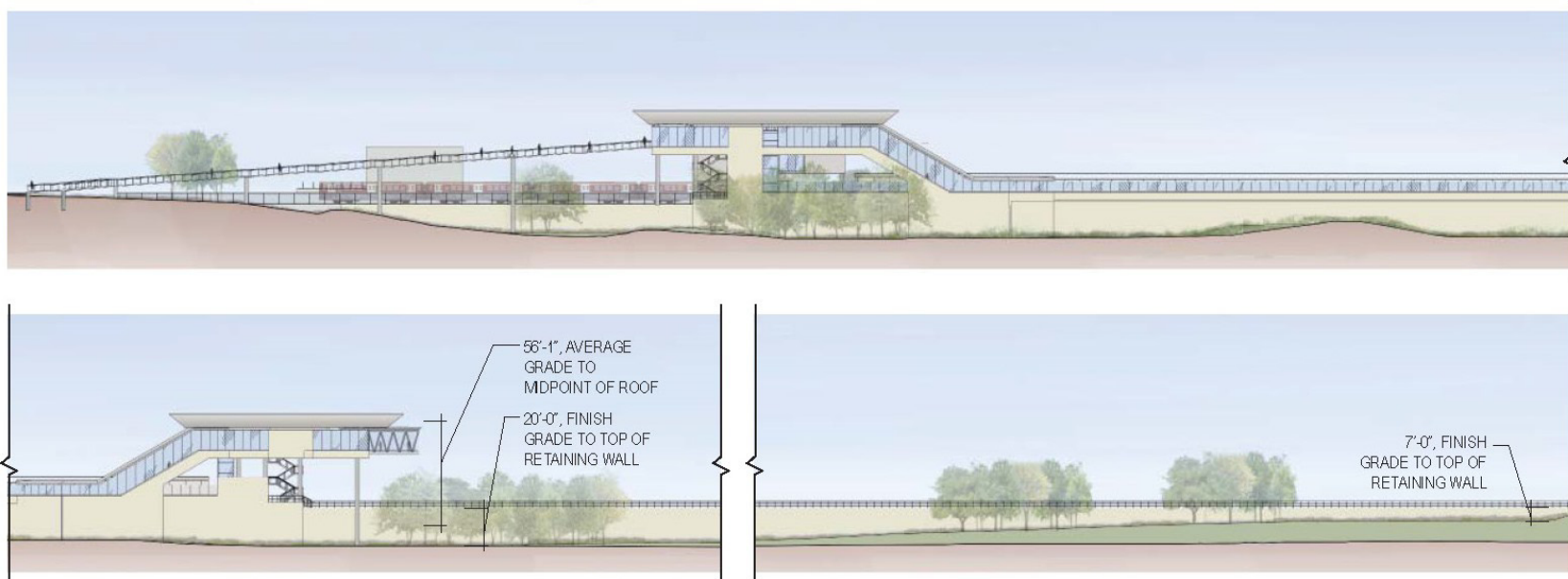


NOTE: SECTIONS DEPICT CONCEPTUAL DESIGNS. ALL DESIGNS OF THE STATION ARE SUBJECT TO ALL APPLICABLE WMATA AND CITY APPROVALS.

601

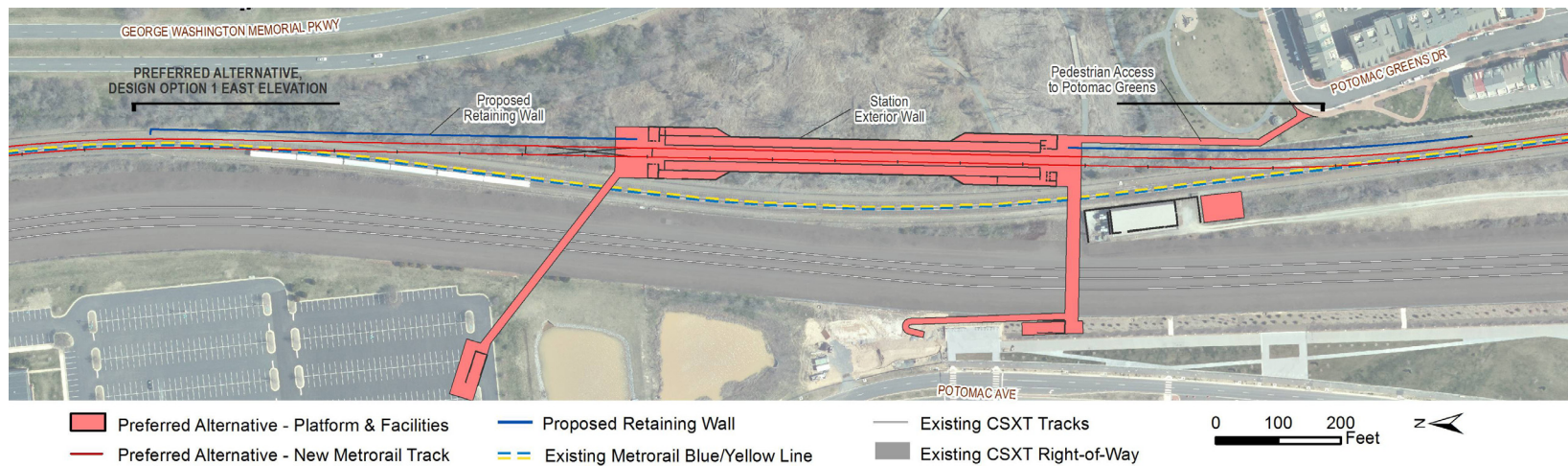
602 **Figure 2-10: Preferred Alternative Station Design Option 1 East Elevation**

Preferred Alternative, Option 1 East Elevation - Full Retaining and Station Walls



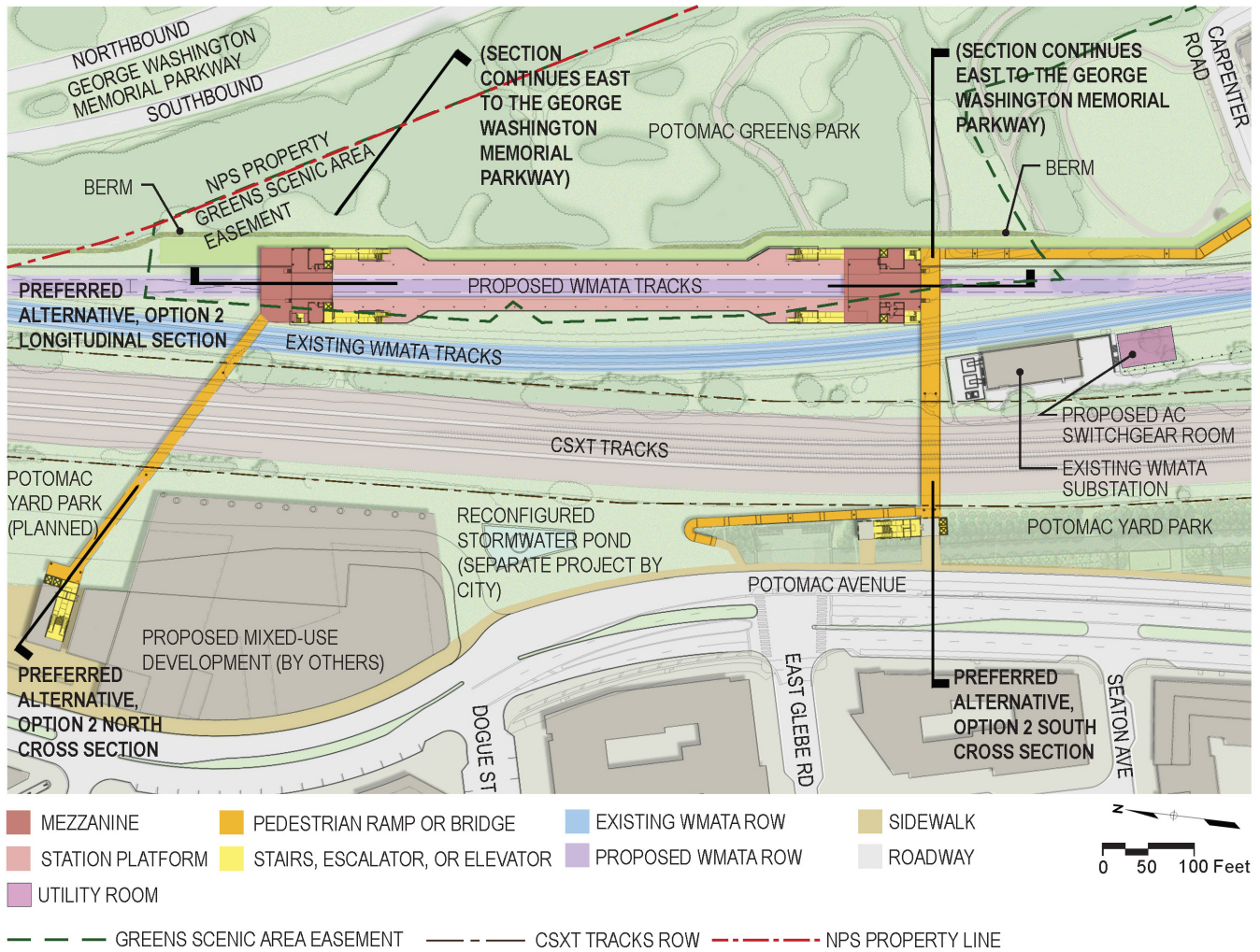
NOTE: SECTIONS DEPICT CONCEPTUAL DESIGNS. ALL DESIGNS OF THE STATION ARE SUBJECT TO ALL APPLICABLE WMATA AND CITY APPROVALS.

603



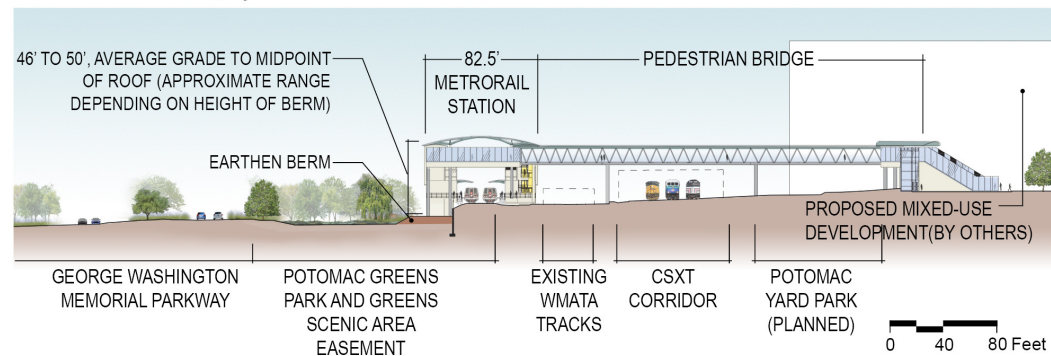
604

605 **Figure 2-11: Preferred Alternative Station Design Option 2 Plan View**

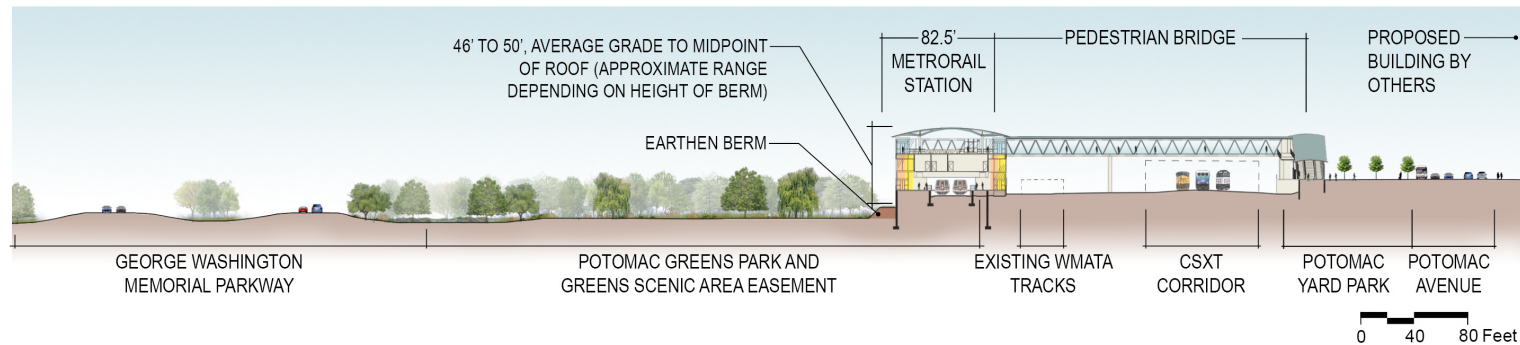


607 **Figure 2-12: Preferred Alternative Station Design Option 2 Cross Sections and Longitudinal Section**

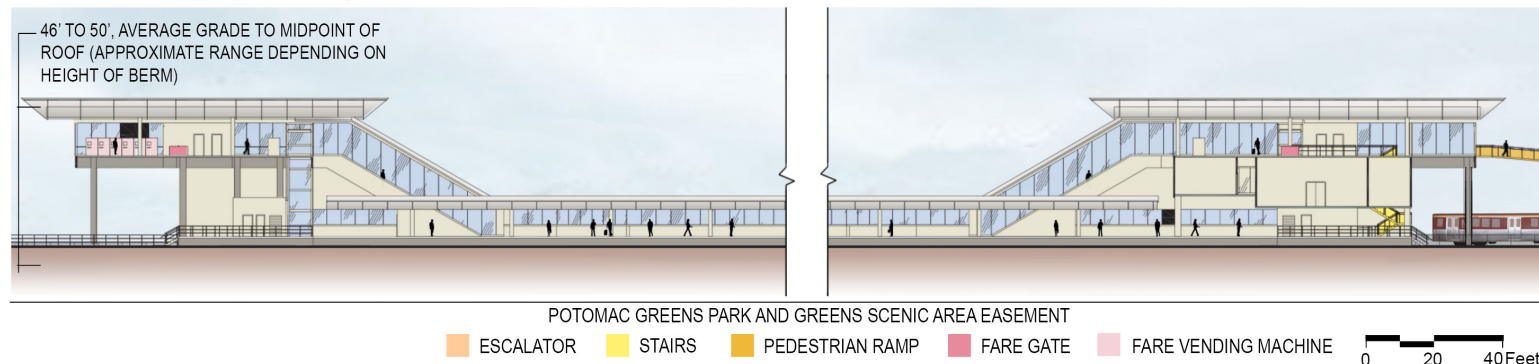
Preferred Alternative, Option 2 North Cross Section - View South



Preferred Alternative, Option 2 South Cross Section - View South



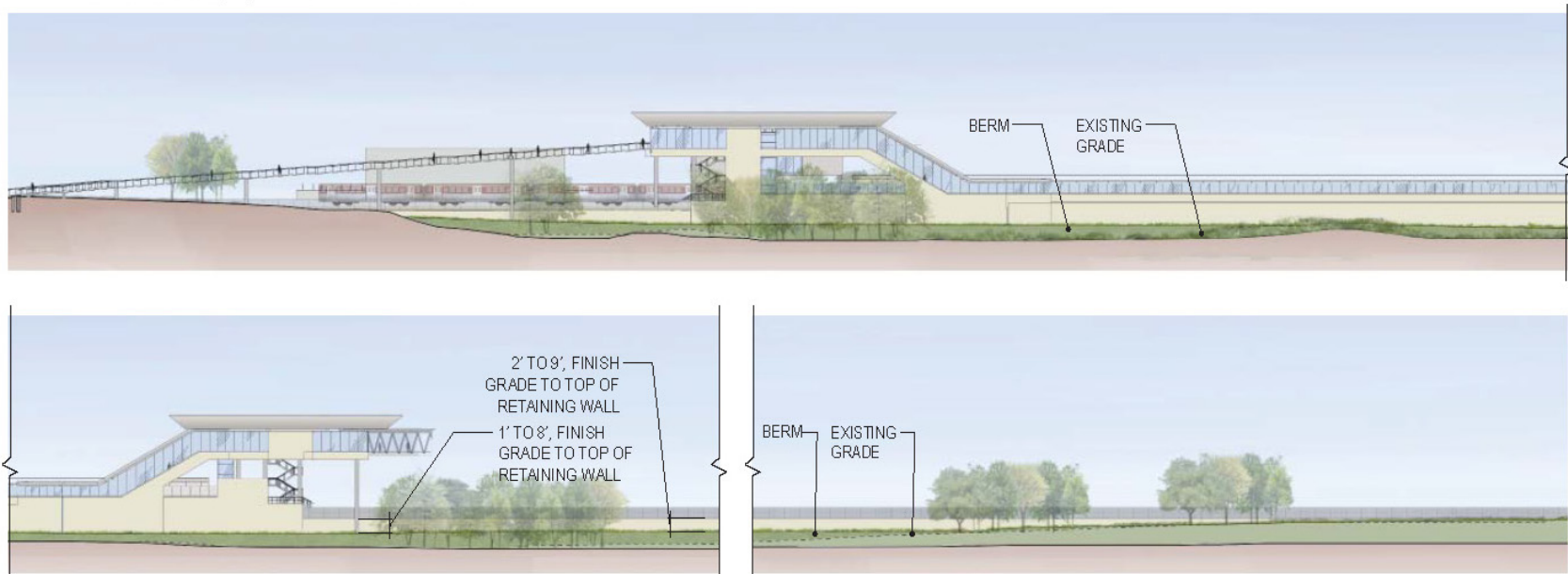
Preferred Alternative, Option 2 Longitudinal Section - View East



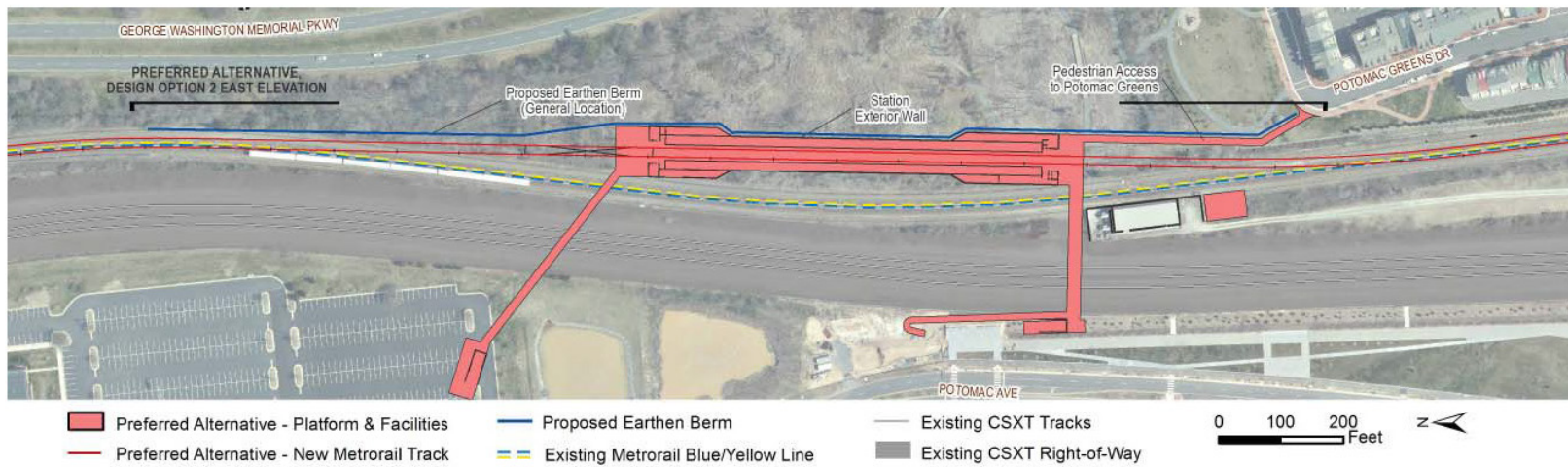
NOTE: SECTIONS DEPICT CONCEPTUAL DESIGNS. ALL DESIGNS OF THE STATION ARE SUBJECT TO ALL APPLICABLE WMATA AND CITY APPROVALS. EXACT HEIGHT OF THE EARTHEN FILL ALONG THE EASTERN FACE OF THE STATION AND REALIGNED TRACK IN OPTION 2 HAS NOT BEEN DETERMINED AND IS SHOWN AT THIS BASE LEVEL FOR INDICATIVE PURPOSES ONLY.

609 **Figure 2-13: Preferred Alternative Station Design Option 2 East Elevation**

Preferred Alternative, Option 2 East Elevation - Berm



NOTE: SECTIONS DEPICT CONCEPTUAL DESIGNS. ALL DESIGNS OF THE STATION ARE SUBJECT TO ALL APPLICABLE WMATA AND CITY APPROVALS. EXACT HEIGHT OF THE EARTHEN FILL BERM ALONG THE EASTERN FACE OF THE STATION AND REALIGNED TRACK IN OPTION 2 HAS NOT BEEN DETERMINED AND IS SHOWN AT THIS BASE LEVEL FOR INDICATIVE PURPOSES ONLY. ACCORDINGLY, THE AREA OF VISIBLE STATION WALL AND ANY RETAINING WALLS WOULD DEPEND ON THE FINALIZED HEIGHT OF THE BERM.



610

611 2.5.2.2 Construction Staging and Access

612 The Preferred Alternative would require realignment of existing track, construction of new track, and
 613 construction of the proposed station in the vicinity of existing Metrorail tracks. The major equipment needed for
 614 construction of the station would include cranes, bulldozers, backhoes, loaders, dump trucks, concrete mixer
 615 trucks, concrete conveyance systems and pumps, and material delivery trucks. Construction is anticipated to
 616 begin in 2017, continue for about three years, and conclude in late 2020. The sequence of major construction
 617 activities would likely consist of:

- 618 • Fencing off the construction site and staging areas;
- 619 • Clearing and grading to prepare the construction site and staging areas;
- 620 • Relocating utilities;
- 621 • Constructing foundations and walls for the station;
- 622 • Constructing the station structure, platforms, mezzanines, and roof;
- 623 • Completing trackwork for the new mainline segment through the station;
- 624 • Establishing the train control systems and traction power systems;
- 625 • Connecting the new track segment to existing mainline and re-routing trains along the new track;
- 626 • Constructing the electrical distribution (AC switchgear) room for the station;
- 627 • Constructing the pedestrian bridges and entry pavilions;
- 628 • Completing station architectural finishes;
- 629 • Grading and landscaping the station area; and
- 630 • Restoring natural areas and parks within construction staging areas and any roadway pavement along
 631 access routes.

632 **Figure 2-14** shows the proposed construction staging area and access to construct the station. Refinements
 633 were made to the preliminary construction staging area and access routes presented in the Draft EIS for Build
 634 Alternative B, Option 2 Construction Access (no access from the GWMP roadway). The refinements, which are
 635 noted below, incorporate more detailed development of construction phasing plans since the Draft EIS and
 636 efforts to reduce impacts to resources identified in the Draft EIS.

637 Staging and Access East of the Existing Metrorail Tracks

638 Access would be required to the area east of the existing Metrorail tracks through the residential areas of
 639 Potomac Greens and Old Town Greens via the entire length of Potomac Greens Drive (0.7 mile) and Carpenter
 640 Road (0.4 mile); construction vehicles would access this area from U.S. Route 1. Refinements from the Build
 641 Alternative B construction staging and access in this area for the Preferred Alternative include:

- 642 • To allow construction vehicles to circulate in a single direction with less impact to neighborhood traffic
 643 flow, the access route through the Potomac Greens neighborhood also includes Carpenter Road. To
 644 ensure safe conditions at the entrance into the construction staging area at the northern end of Potomac
 645 Greens neighborhood at Potomac Greens Park, this portion of the park, including the lawn area and
 646 boardwalk trails, and a portion of the Carpenter Road Trail will be closed to the public for the duration of
 647 construction. The project proposes temporarily relocating or closing the playground in this area for the
 648 duration of construction.
- 649 • To allow for potential minor design modifications to the station pedestrian and bicycle access facilities in
 650 Potomac Greens Park, the extent of the construction staging area and access area is expanded by up
 651 to 0.88 acre to accommodate potential modifications.
- 652 • To minimize impacts to the GWMP, the extent of the construction staging area on the GWMP property
 653 under Build Alternative B is removed for the Preferred Alternative except where required for direct
 654 access to build the realigned track at the northern end of the project site. The construction staging area
 655 would temporarily occupy between 0.25 and 0.42 acre of GWMP property.

- A wider area of construction activity immediately north of the station is indicated to accommodate installation of a crossover switch on the realigned track.

Staging and Access West of the Existing Metrorail Tracks

The Preferred Alternative would also require access to the area west of the existing Metrorail tracks for some construction tasks, including the construction of the two pedestrian bridges. The access to this area west of the existing Metrorail tracks would utilize the access road through the Rail Park to the WMATA traction power substation (0.5 mile), crossing the existing Metrorail alignment at the tennis court area of Old Town Greens (where Metrorail begins to travel below-grade). A construction access easement would also be required across a portion of the CSXT right-of-way so that construction vehicles utilizing the Rail Park roadway can get around the west side of the existing traction power substation and be able to access the area north of the substation between the existing CSXT and Metrorail tracks. The easement would not cross CSXT tracks. Refinements from the Build Alternative B construction staging and access in this area for the Preferred Alternative include:

- To further minimize the volume of construction traffic along Potomac Greens Drive and Carpenter Road north of Old Town Greens, the project would locate various construction functions, as feasible, within the area west of the Metrorail tracks that can be accessed by the WMATA substation access road. These functions could include construction elements such as contractor's offices that do not depend on direct access to the area east of the Metrorail tracks.
- The construction staging area is expanded by 5.37 acres to the south across the full extent of the City of Alexandria Rail Park to potentially accommodate construction elements such as contracting offices at this location rather than at the northern end of the Potomac Greens neighborhood, thereby reducing vehicular traffic along Potomac Greens Drive by construction employees.
- To ensure safe conditions along the construction access route via the WMATA substation access road through the Old Town Greens common area, the project proposes temporarily relocating the playground to another site within Old Town Greens and temporarily closing the tennis courts for the duration of construction. For project construction access along the WMATA substation access road within the Old Town Greens neighborhood common area, appropriate access arrangements would be obtained for all affected properties prior to construction.

Staging and Access West of the CSXT Right-of-Way

Although the Preferred Alternative is located east of the CSXT right-of-way, access would be required west of the CSXT right-of-way in Potomac Yard Park and North Potomac Yard to construct landings and vertical circulation elements (escalators, elevators, and ramp) for the pedestrian bridges. Access would be provided via Potomac Avenue and U.S. Route 1. Refinements from the Build Alternative B construction staging and access in this area for the Preferred Alternative include:

- To allow for potential minor design modifications to the station entrance pavilions and pedestrian and bicycle access facilities along Potomac Yard Park, the extent of the construction staging area and access area is expanded by 0.15 acre to accommodate potential modifications.

General Access Provisions

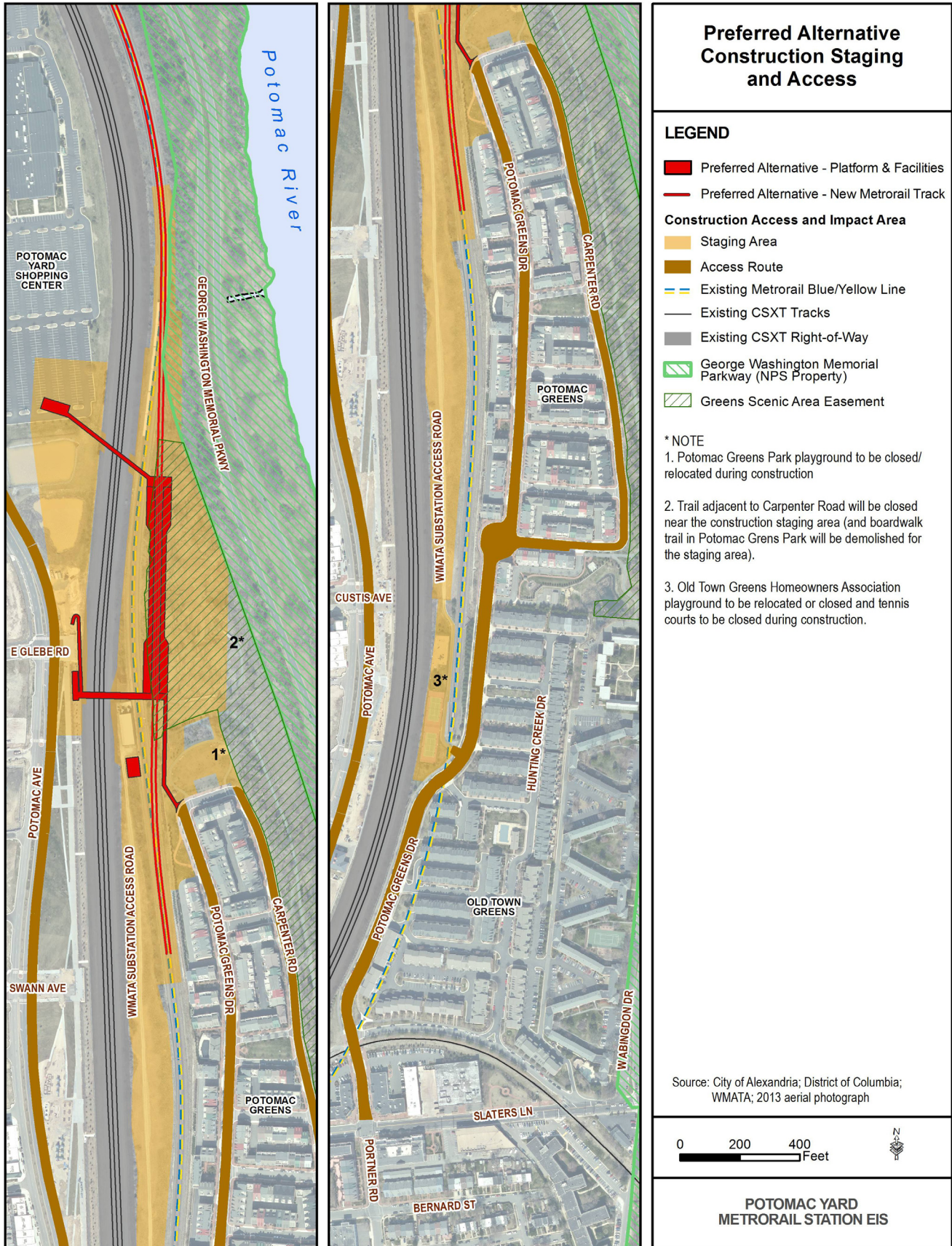
No access from the GWMP would be required. Commercial vehicles are prohibited from the GWMP under *NPS Management Policies 2006* (9.2.1.2.1) and Federal regulations (36 CFR 5.6). The NPS policies state that "commercial traffic will be prohibited on roads within parks, except for the purpose of serving park visitors and park operations (9.2.1.2.1)."

To minimize the volume of construction traffic within the Old Town Greens and Potomac Greens neighborhoods, the project would pursue opportunities for off-site parking by construction employees.

Total Staging and Access Area

As shown in **Figure 2-14** the proposed construction staging area would occupy 15.56 to 16.01 acres of land surrounding the proposed station facilities and realigned track. This area includes 0.25 to 0.42 acres of GWMP (U.S. government property administered by NPS), 2.86 to 3.09 acres of Greens Scenic Area easement land (easement administered by NPS), 1.78 acres of South Potomac Yard Park, 0.48 acre of North Potomac Yard Park, 4.10 to 4.33 acres of Potomac Greens Park, and 1.82 acres of land currently occupied by the Potomac Yard Movie Theater and shopping center adjacent parking lot.

706 **Figure 2-14: Preferred Alternative Construction Staging and Access**



707

708 2.5.2.3 Proposed Impact Minimization and Mitigation for the Preferred Alternative

709 The Preferred Alternative includes measures to minimize and mitigate potential negative impacts on the project
710 area resources. **Table 3-3** on page 3-10 summarizes these measures by resource.

711 2.6 Evaluation of Alternatives Considered in the Final EIS

712 This section provides:

- 713 • Summary comparison of the No Build Alternative and the Preferred Alternative based on an alternative's
714 ability to support the project purpose and need; and
- 715 • Description of the trade-offs between the benefits and effects of the alternatives.

716 2.6.1 Support for Project Purpose and Need

717 Preferred Alternative best supports the stated purpose and need when compared to the No Build Alternative
718 because it:

- 719 • Improves the regional transit accessibility of Potomac Yard;
- 720 • Expands transportation choices by locating regional transit within walking distance of residents and employees
721 of the Potomac Yard area; and
- 722 • Accommodates travel demand by shifting automobile trips to transit and other non-auto modes.

723 The Preferred Alternative would support the purpose and need by constructing a new Metrorail station at
724 Potomac Yard that would provide direct access to the regional transit system. Regional transit services serve
725 trips to/from key destinations and travel corridors across the metropolitan area by providing direct or connecting
726 service with widely spaced stations and generally dedicated right-of-way to provide quicker travel times than local
727 service. Locating a station in Potomac Yard minimizes travel times and transfers by transit to regional
728 destinations served by the system. Although the No Build Alternative improves connecting service to the existing
729 Braddock Road and Crystal City Metrorail Stations via the CCPY Transitway (also known as Metroway), the
730 Transitway does not provide direct regional transit service to and from Potomac Yard.

731 The Preferred Alternative would serve planned population and employment growth in the Potomac Yard area by
732 providing direct access to an additional transportation option, regional transit, for residents, employees, and
733 visitors to the area. The majority of residents and employees within Potomac Yard would be within walking
734 distance of the Metrorail station proposed under the Preferred Alternative. Walking distance is defined as ½ mile
735 for residents (a 10-minute walk) and ¼ mile for employees (a 5-minute walk), based on industry experience.

736 The Preferred Alternative would reduce the number automobile trips with an origin or destination in Potomac
737 Yard in comparison to the No Build Alternative. Thus, the Preferred Alternative would also result in a higher
738 share of non-automobile trips to and from Potomac Yard compared the No Build Alternative. Non-auto mode is
739 defined as trips that are taken on foot, by bicycle, or using transit.

740 2.6.2 Benefits and Effects of the Alternatives

741 A summary of the environmental benefits and impacts of the No-Build Alternative and the Preferred Alternative
742 is shown in **Table 3-1** on page 3-2. In addition to the benefits relative to meeting the project purpose and need
743 described in **Section 2.6.1** above, the Preferred Alternative would be consistent with the City of Alexandria and
744 regional transportation plans and would provide improved mobility and Metrorail access for neighborhoods and
745 communities in the vicinity of the proposed station. These benefits include improved mobility for low-income
746 and minority residents in the area and enhanced access to the Ronald Reagan Washington National Airport.

747 The Preferred Alternative would result in some negative effects in comparison to the No Build Alternative. These
748 adverse effects include the need to execute a land exchange with NPS for GWMP land necessary to
749 accommodate a portion of the station's connecting track and the need to use part of the Greens Scenic Area
750 easement (administered by NPS) to accommodate the station. The GWMP is listed in the National Register of
751 Historic Places (NRHP) and the Greens Scenic Area easement (administered by NPS) has been determined as
752 eligible for the NRHP as a contributing resource to the GWMP. The Preferred Alternative would also result in
753 adverse short- and long-term visual impacts to views for the GWMP. The Preferred Alternative would result in
754 impacts to City of Alexandria open space and parks, as well as private land, natural habitat areas, on-street

755 parking, wetlands, resource protection areas, impervious surface, stormwater, floodplains, and noise (for train
756 announcements and door chimes).

757 During construction the Preferred Alternative would also result in temporary impacts to GWMP property, Greens
758 Scenic Area easement land, wetlands, resource protection areas, floodplains, Metrorail operations, freight rail
759 operations, construction access roads, parks, air quality, and noise. The construction impacts to the GWMP and
760 Greens Scenic Area easement would also require clearing of trees and other vegetation to accommodate
761 construction staging areas, which would impact views from the GWMP.

762 On-going refinements to the Preferred Alternative include measures to minimize and mitigate the potential
763 negative impacts of the station. A summary of the proposed impact minimization and mitigation measures to be
764 applied to the Preferred Alternative is presented in **Table 3-3** on page 3-10. The City of Alexandria will also
765 establish a Net Benefits Agreement with NPS that documents the mitigation measures and enhancements
766 necessary to minimize harm to the GWMP resulting from implementation of the station, so that the project would
767 result in an overall net benefit to the GWMP. The draft agreement is described in **Section 3.10.4**, page 3-167,
768 and included in **Appendix L**.